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OHIO STATE UNIVERSITY
BULLETIN

VOLUME XL MAY 20, 1936 NUMBER 27

GRADUATE SCHOOL

1936-1937

PUBLISHED BY THE UNIVERSITY AT COLUMBUS

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GRADUATE SCHOOL

1936-1937

THE OHIO STATE UNIVERSITY
COLUMBUS

CONTENTS

CALENDAR FOR 1936

JANUARY.

S	M	T	W	T	F	S
....	....	....	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	....
....	....	....	....	....	....	....

FEBRUARY.

S	M	T	W	T	F	S
....	....	....	....	....	....	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
....	....	....	....	....	....	....

MARCH.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	....	....	....	....
....	....	....	....	....	....	....

APRIL.

S	M	T	W	T	F	S
....	....	....	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	....	....
....	....	....	....	....	....	....

MAY.

S	M	T	W	T	F	S
....	....	....	....	....	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	....	....	....	....	....	....

JUNE.

S	M	T	W	T	F	S
....	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	....	....	....	....
....	....	....	....	....	....	....

JULY.

S	M	T	W	T	F	S
....	....	....	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	....
....	....	....	....	....	....	....

AUGUST.

S	M	T	W	T	F	S
....	....	....	....	....	....	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	....	....	....	....	....

SEPTEMBER.

S	M	T	W	T	F	S
....	....	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	....	....	....
....	....	....	....	....	....	....

OCTOBER.

S	M	T	W	T	F	S
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4	5	6	7	8	9	10
11	12	13	14	15	16	17
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NOVEMBER.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
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DECEMBER.

S	M	T	W	T	F	S
....	....	1	2	3	4	5
6	7	8	9	10	11	12
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20	21	22	23	24	25	26
27	28	29	30	31	....	....
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CALENDAR FOR 1937

JANUARY.

S	M	T	W	T	F	S
....	....	....	....	....	1	2
3	4	5	6	7	8	9
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17	18	19	20	21	22	23
24	25	26	27	28	29	30
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FEBRUARY.

S	M	T	W	T	F	S
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7	8	9	10	11	12	13
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MARCH.

S	M	T	W	T	F	S
....	1	2	3	4	5	6
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21	22	23	24	25	26	27
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....	....	....	....	1	2	3
4	5	6	7	8	9	10
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MAY.

S	M	T	W	T	F	S
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2	3	4	5	6	7	8
9	10	11	12	13	14	15
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23	24	25	26	27	28	29
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....	....	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
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4	5	6	7	8	9	10
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18	19	20	21	22	23	24
25	26	27	28	29	30	31
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1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	....	....	....	....
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S	M	T	W	T	F	S
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5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	....	....
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3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	....	....	....	....	....	....

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S	M	T	W	T	F	S
....	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	....	....	....	....
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S	M	T	W	T	F	S
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5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	....
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UNIVERSITY CALENDAR

1936

SUMMER QUARTER

May 25 to 29	Entrance Examinations.
June 22 to 29	Physical Examinations for all new students.
June 22	Latest day for registration and payment of fees without penalty. (See page 14.)
June 23	Classes begin, 7:30 A.M.
June 27	Intelligence Test for all new students (Saturday P.M.).
July 4	Independence Day. No classes.
July 27, 28, 29	Final Examinations, first term (at regular class hours).
July 24, 25	Physical Examinations for all new students.
July 29	First term ends, 5:30 P.M.
July 30	Second term begins, 7:30 A.M.
August 1	Intelligence Test for all new students (Saturday P.M.).
September 2, 3, 4	Final Examinations (at regular class hours).
September 4	Summer Convocation (Commencement), 2:00 P.M.
September 4	Summer Quarter ends, 6:00 P.M.

AUTUMN QUARTER

September 21 to 25	Entrance Examinations.
September 23 to 28	Freshman Week.
September 28	Physical Examinations for students other than Freshmen.
September 28	Latest day for registration and payment of fees without penalty. (See page 14.)
September 29	Classes begin, 8:00 A.M.
October 3	Intelligence Test for all new students other than Freshmen (Saturday A.M.).
November 11	Armistice Day. No classes after 12 M.
November 26, 27, 28	Thanksgiving Recess.
December 16, 17, 18, 19	Final Examinations.
December 18	Autumn Convocation (Commencement), 2:00 P.M.
December 19	Autumn Quarter ends, 6:00 P.M.

1937

WINTER QUARTER

January 4 to 7	Physical Examinations for all new students.
January 4	Latest day for registration and payment of fees without penalty. (See page 14.)
January 5	Classes begin, 8:00 A.M.
January 9	Intelligence Test for all new students (Saturday A.M.).
February 22	University Day. No classes.
March 17, 18, 19, 20	Final Examinations.
March 19	Winter Convocation (Commencement), 2:00 P.M.
March 20	Winter Quarter ends, 6:00 P.M.

SPRING QUARTER

March 29	Latest day for registration and payment of fees without penalty. (See page 14.)
March 30	Classes begin, 8:00 A.M.
March 29 to 31	Physical Examinations for all new students.
April 3	Intelligence Test for all new students (Saturday A.M.).
May 28	R.O.T.C. Review and Presentation of Commissions.
May 30	Memorial Day.
June 9, 10, 11, 12	Final Examinations.
June 12	Alumni Day.
June 13	Baccalaureate Sermon.
June 14	Class Day.
June 14	Spring Convocation (Commencement).
June 14	Spring Quarter ends.
June 21	Summer Quarter (1937) begins.
September 3	Summer Quarter (1937) ends.
September 28	Autumn Quarter (1937) classes begin.

ADMINISTRATION

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JULIUS F. STONE, Vice-Chairman.....Columbus
NEWTON D. BAKER.....Cleveland
HARRY A. CATON.....Coshocton
HERBERT S. ATKINSON.....Columbus
LAWRENCE E. LAYBOURNE.....Springfield
M. EDITH CAMPBELL.....Cincinnati

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President.....GEORGE W. RIGHTMIRE
Office: Administration Building—UN-3148; Campus 312
Residence: Ohio State University Campus—UN-3148; Campus 274

Secretary of the Board of Trustees and Business Manager.....CARL E. STEEB
Office: Administration Building—UN-3148; Campus 332
Residence: 198 W. 11th Ave.—UN-4732

Vice President.....J. LEWIS MORRILL
Office: Administration Building—UN-3148; Campus 628
Residence: 459 W. 9th Ave.—UN-9427

Assistant to the President.....GEORGE W. ECKELBERRY
Office: Administration Building—UN-3148; Campus 380
Residence: 2023 Collingswood Rd., Upper Arlington—KI-1343

Registrar, University Editor, Secretary of the University Faculty, and Alumni Recorder.....EDITH D. COCKINS
Office: Administration Building—UN-3148; Campus 314, 459
Residence: 1580 Guilford Rd., Upper Arlington—KI-2726

University Examiner.....BLAND L. STRADLEY
Office: Administration Building—UN-3148; Campus 412
Residence: Canal Winchester—Canal Winchester Ex. 71

Executive Clerk.....KATHERINE A. VOGEL
Office: Administration Building—UN-3148; Campus 312
Residence: 1040 Elmwood Ave.—KI-5883

Comptroller.....CHARLES A. KUNTZ
Office: Administration Building—UN-3148; Campus 332
Residence: 123 Jeffrey Pl.—LA-3606

Cashier.....FLORIS D. HANE
Office: Administration Building—UN-3148; Campus 372
Residence: 373 13th Ave.—WA-1054

Dean of Men.....JOSEPH A. PARK
Office: Administration Building—UN-3148; Campus 283
Residence: 1474 Doone Rd., Upper Arlington—KI-1702

Dean of Women.....ESTHER ALLEN GAW
Office: Pomerene Hall—UN-3148; Campus 480, 238, 226
Residence: 60 Jefferson Ave.

House Superintendent, Residence Halls.....EMMA E. PROUT
Office: Oxley Hall—UN-3148; Campus 346
Residence: Mack Hall—UN-3148; Campus 264

THE GRADUATE SCHOOL

Dean.....WILLIAM McPHERSON
Office: 106 University Hall—UN-3148; Campus 466
Residence: 198 16th Ave.—WA-1579

THE GRADUATE COUNCIL

THE DEAN OF THE GRADUATE SCHOOL, Chairman, *ex officio*
BOYD H. BODE, Ph.D., LL.D., Professor of Education
RICHARD BRADFIELD, Ph.D., Representing the Ohio Agricultural Experiment Station
WALLACE W. CHARTERS, Ph.D., LL.D., Director, Bureau of Educational Research
GEORGE M. CURTIS, M.A., Ph.D., M.D., Professor of Medical and Surgical Research
EVERETT L. DAKAN, B.Sc., Professor of Poultry Husbandry
DAN H. EIKENBERRY, Ph.D., Professor of Education
HORACE B. ENGLISH, Ph.D., Professor of Psychology
WILLIAM LLOYD EVANS, M.Sc., Ph.D., Professor of Chemistry
FELIX E. HELD, Ph.D., Professor of Economics and Business Organization
JAMES R. HOPKINS, Professor of Fine Arts
CLIFFORD L. JAMES, M.A., Ph.D., Associate Professor of Economics
ARTHUR J. KLEIN, M.A., Ph.D., LL.D., Professor of Education
EARL N. MANCHESTER, B.A., University Librarian
CLYDE T. MORRIS, C.E., Professor of Civil Engineering
TIBOR RADÓ, Ph.D., Professor of Mathematics
ROBERT E. ROCKWOOD, Ph.D., Professor of Romance Languages
ALPHEUS W. SMITH, Ph.D., Professor of Physics
LAURENCE H. SNYDER, M.S., Sc.D., Professor of Zoology
LEWIS H. TIFFANY, Ph.D., Professor of Botany
JOHN B. TITCHENER, Ph.D., Associate Professor of Classical Languages
HARVEY WALKER, Ph.D., Professor of Political Science
HAROLD B. WALLEY, A.M., Ph.D., Professor of English
ARTHUR S. WATTS, Cer.E., Professor of Ceramic Engineering
CARL WITTKE, Ph.D., Professor of History
JOHN YOUNGER, B.Sc. in Engr., Professor of Industrial Engineering

REPRESENTING MIAMI UNIVERSITY

CHARLES H. HANDSCHIN, Ph.D., Professor of German, Miami University

FELLOWSHIPS AND SCHOLARSHIPS
1935-1936

UNIVERSITY FELLOWSHIPS

ESTON JACKSON ASHER.....Psychology
GORDON WILLIAM HAUG (Spring Quarter).....Entomology
PAUL LAVERNE RICE (Autumn and Winter Quarters).....Entomology
ROBERT RIENOW.....Political Science
PAUL ELWOOD STANLEY.....Physics
ROBERT CLEMENS TURNER.....Business Organization
MAURICE HART VANHORN.....Chemistry

UNIVERSITY SCHOLARSHIPS

JOSEPH HENRY AKEROYD, JR.....Physiological Chemistry
BERNICE ANNE ALLEN.....Sociology
WARREN LYTLE CALVERT.....Geology
JOSEPH PATRICK CREAGH.....Chemical Engineering
RALPH WALDO CUMMINGS.....Agronomy
AGNES FOWLER (Winter and Spring Quarters).....Romance Languages
RAYMOND EUGENE GLOS.....Business Organization
KATHRYN ELIZABETH GROVER.....Psychology
MARY EDINGTON JENKINSON.....Romance Languages
GILBERT JOHN JORDAN.....German
EUGENE HENRY KLEINPELL.....History
HARRY JOHN KLEPSER (Autumn Quarter only).....Geology
PHILIP BERKELEY KRAUS.....Chemical Engineering
LOWELL POND LELAND.....History
WILLIAM EDMUND LIVEZEY.....History
HOWARD NICHOLAS MAXWELL.....Physics
LAURA ANN MICK (Summer Quarter only).....History

DWIGHT HOYT MOREHEAD.....Economics
MARY ROSEAMONDE PORTER.....Education
ERWIN ARTHUR ROBINSON.....English
WILLIAM ALDRETE BENTON SCHRADER.....Psychology
GERTRUDE EVANGELINE SCOTT.....Romance Languages
EDWIN M. SHERWOOD.....Electrical Engineering
MYRON LUEHRS TRIPP (Autumn and Winter Quarters).....History
ELIZABETH CLELAND WAGNER.....Botany
JESSE O. WHITE.....Chemistry

NATHANIEL WRIGHT LORD FELLOWSHIP

ALBERT JOHN FRANZ.....Metallurgy

STILLMAN W. ROBINSON FELLOWSHIP

CLARENCE MERLE FORAKER.....Electrical Engineering

BENNETT WOOD GREEN TRAVELLING FELLOWSHIP

CHARLES ALDEN BARRELL.....Political Science

duPONT CELLULOSE RESEARCH FELLOWSHIP
(Post Doctorate)

LOUIS WILLIAM GEORGES.....Chemistry

INTERNATIONAL EXCHANGE SCHOLAR

YVONNE BENOIT-ETLINGER.....Education
(Registered in the College of Education)

BATTELLE MEMORIAL INSTITUTE FELLOWSHIPS

GERALD MATHIOT COVER (Summer and Autumn Quarters).....Metallurgy
HOWARD JOSEPH FRALISH (Summer and Autumn Quarters).....Physics
CLARK GORDON KECKLER.....Metallurgy
NORBERT KENNETH KOEBEL.....Metallurgy

NATIONAL ALUMINATE FELLOWSHIP

RICHARD ULMER.....Chemistry

COMMONWEALTH FUND FELLOWSHIP
(Post Doctorate)

ROBERT O. L. CURRY.....Phonetics

KRAFT-PHENIX CHEESE CORPORATION FELLOWSHIP

SIG CHRISTIAN SVANOE.....Dairy Technology

MARGARET G. HARDER PAN-AMERICAN SCHOLARSHIP

OFELIA MENDOZA.....Education
(Registered in the College of Education)

RESEARCH FELLOW IN CERAMICS

WILLIAM REX McLAIN.....Ceramic Engineering

EDWARD ORTON JR. CERAMIC FOUNDATION FELLOWSHIP

ROBERT FULLINGTON REA.....Ceramic Engineering

UNITED STATES POTTERS ASSOCIATION FELLOWSHIP

JOHN HENRY KOENIG.....Ceramic Engineering

NATIONAL PEIPING UNIVERSITY FELLOWSHIP

CHIH HUA HSIA.....Agronomy

S.M.A. CORPORATION FELLOWSHIP

MAURICE LANDY.....Bacteriology

JOHN A. BOWNOCKER FELLOWSHIPS

HARRY JOHN KLEPSER (Winter and Spring Quarters).....Geology
MYRON THOMAS STURGEON (Winter and Spring Quarters).....Geology

HONORARY FELLOWSHIPS

MOSHE BRILL.....Psychology
ESTHER LUCILLE GRANT (Summer Quarter only).....Classical Languages
JOSEPH J. LOWDEN (Summer Quarter only).....Education
LEWIS E. MILLER (Summer Quarter only).....Chemistry
SOL SOLTZBERG (Summer Quarter only).....Chemistry
RALPH H. STIMSON.....Political Science
ROBERT F. WALLACE.....Psychology
JULIUS R. WEINBERG.....Philosophy
JOHN E. WENRICK (Summer Quarter only).....Psychology
JONATHAN W. WILLIAMS (Summer Quarter only).....Chemistry

THE OHIO STATE UNIVERSITY

LOCATION

The Ohio State University is situated within the corporate limits of the city of Columbus. It is supported by appropriations from the State and Federal governments. The University has almost 1,400 acres of land with nearly 400 acres in the campus. The total value of land, buildings, and equipment is $22,695,487.00.

ORGANIZATION

For convenience of administration the departments of the University are grouped into organizations called Colleges. The Ohio State University comprises ten Colleges and a Graduate School, each under the administration of a Dean and College Faculty, as follows:

Graduate School, College of Agriculture (including the School of Home Economics), College of Arts and Sciences, College of Commerce and Administration (including the Schools of Journalism and Social Administration), College of Dentistry, College of Education (including the School of Nursing), College of Engineering (including the School of Mineral Industries), College of Law, College of Medicine, College of Pharmacy, College of Veterinary Medicine.

THE UNIVERSITY YEAR—FOUR QUARTERS

The University year is divided into four Quarters, each approximately eleven weeks in length. The Summer Quarter is further divided into two terms of approximately six weeks each. Complete courses that are so announced may be taken for either term or for the entire Quarter.

This *Bulletin* is devoted to the work of the Graduate School for the Autumn, Winter, and Spring Quarters, 1936-1937. The announcements for the Summer Quarter are printed in the Summer Quarter Bulletin.

NOTE: Bulletins describing the work of the several Colleges may be obtained by addressing the University Examiner, The Ohio State University, Columbus, and stating the College in which the writer is interested. (For list of bulletins, see the last page.)

THE GRADUATE SCHOOL

GENERAL INFORMATION

The office of the Graduate School is located in Room 106, University Hall, (the large building with the clock in the tower). The office is open from 8:00 A. M. to 5:00 P. M. daily, except Saturday. On Saturday, it is open from 8:00 A. M. to 12:00 M.

The offices of the President of the University, the University Examiner, the Registrar, and the Bursar are located in the Administration Building.

ORGANIZATION AND ADMINISTRATION

The instruction and training of graduate students has been one of the functions of The Ohio State University since 1878, when the first graduate student was in residence. For a number of years the graduate work of the University was unorganized and each department conducted its own work with little reference to that of other departments. After the University was divided into colleges, each college controlled the graduate work offered in the various

departments constituting that college. In 1902, however, the graduate work within the College of Arts had assumed sufficient proportions to warrant the organization of a Graduate School to secure an effective and systematic arrangement of the graduate work of that college. Finally in 1911, there was organized the Graduate School of the University to administer all the graduate work offered in the several departments of the University. This School is under the administration of a Graduate Council consisting of twenty-seven members. The membership of the Council is made up of the following: the Dean of the Graduate School, the Director of the Bureau of Educational Research, the Director of the Engineering Experiment Station, a representative of the Ohio Agricultural Experiment Station, the University Librarian, twenty-one members of the instructional staff appointed from among those departments offering graduate work in The Ohio State University, and a representative from the faculty of Miami University. This council reports directly to the University Faculty, which is the legislative body of the Graduate School, as well as of the ten colleges.

All communications and inquiries regarding matters connected with the Graduate School, whether from prospective students or from those whose work is in progress, should be directed to the Dean of the Graduate School.

AGREEMENTS BETWEEN THE OHIO STATE UNIVERSITY AND OTHER INSTITUTIONS CONCERNING GRADUATE WORK

In order that other state supported universities may be able to take advantage of the facilities of the Graduate School, and also in order that certain institutions may be utilized for the pursuit of research work in connection with the Graduate School, agreements have been made between the Board of Trustees of The Ohio State University and the following institutions:

(a) **With Miami University.** Miami University is represented upon the Graduate Council of The Ohio State University. Part-time assistants connected with the instructional staff of Miami University may pursue their graduate work for the Master's degree at Miami University subject to the supervision of the Graduate Council of The Ohio State University, and upon the successful completion of the same will receive their degrees from The Ohio State University. Such students must be registered in the Graduate School of the Ohio State University while pursuing their work.

(b) **With the Ohio Agricultural Experiment Station.** Persons engaged in investigation at the Ohio Agricultural Experiment Station may register in the Graduate School of the University and the research work carried on at the Station by such persons may be counted towards a graduate degree under appropriate restrictions. All such cases, however, shall be considered individual and subject to detailed examination on the part of the Graduate Council. It is possible for a student to complete his work for the Master's degree in residence at the Station alone. For the Doctor's degree he must spend at least one year in residence at The Ohio State University. In all cases, however, the work of the students is carried on under the general rules and regulations of the Graduate Council and the final examinations must be taken at the University in the presence of representatives of the Experiment Station Staff and of the Graduate Council.

(c) **With the Merrill-Palmer School.** A graduate of The Ohio State University who has completed all the necessary undergraduate requirements may fulfill the residence requirement for the Master's degree by satisfactorily completing one Quarter of acceptable work in residence at The Ohio State University, and two additional Quarters of acceptable work in residence at the Merrill-Palmer School. Before entering the Merrill-Palmer School, the candidate must confer with the chairman of the department at The Ohio State University in which he wishes to specialize, under whose direction a general

course of study for the Master's degree will be arranged. The thesis subject must be of such character as to enable the candidate to carry on experimental work at the Merrill-Palmer School.

The final examinations of the candidate will be conducted by a committee consisting of members of the instructional staff of this University together with representatives of the Merrill-Palmer School, according to the rules governing the Master's degree. The thesis must meet with the approval of both the Merrill-Palmer School and this University.

Students carrying on work at the Merrill-Palmer School under the above regulations must also register at the same time in the Graduate School of this University, but will not be required to pay fees in this University.

(d) **The Perkins Observatory.** The Perkins Observatory is jointly maintained and administered by the Ohio Wesleyan University and the Ohio State University. Its facilities are, therefore, available for students registered in the Graduate School desiring to pursue research work in astronomy or astrophysics.

The principal instrument of the Observatory is a large reflecting telescope, the mirror for which was cast by the Bureau of Standards and is the first large piece of optical glass made in this country. The reflecting surface measures 69 inches in diameter and offers an unusual equipment for astronomical and astrophysical research. There is an auxiliary photographic doublet for six-inch aperture, and a solar objective of 25 feet focal length.

The Observatory is being provided with auxiliary scientific equipment which will afford special facilities for photometric, spectroscopic, and radiometric investigations.

The main building houses the offices for the staff, a lecture room, a spacious library, research laboratory, photographic dark rooms, and an instrument shop for the construction of special apparatus.

A solar program is daily maintained in connection with Mount Wilson, Yerkes, Harvard, and the Naval Observatories, and automatic radio apparatus is used in the continuous study of the correlation of solar phenomena with electric wave transmission.

Members of the scientific staff of the Observatory are also members of the staff of the Department of Physics and Astronomy. The facilities of the Mendenhall Laboratory of Physics and the Emerson McMillin Observatory are available as far as possible to supplement the facilities of the Perkins Observatory, and the staff of the Mendenhall Laboratory of Physics cooperates fully with the staff of the Observatory in the supervision and direction of research. Unusual opportunities are thus offered for graduate and research work in astronomy and astrophysics.

(e) **With the Bureau of Juvenile Research of the State of Ohio.** Students who are registered in the Graduate School of The Ohio State University and who are candidates for a Master's degree, specializing in Clinical Psychology, may do not to exceed one-third of the work required for this degree at the Bureau of Juvenile Research. All such work must be approved in advance by a professional member of the Clinical Division of the Department of Psychology, and all credits received for such work must be submitted under his signature.

Candidates for the degree of Doctor of Philosophy specializing in Clinical Psychology, may likewise carry on work at the Bureau of Juvenile Research. The amount of such work shall be determined in each individual case by a professional member of the Division of Clinical Psychology of the Department of Psychology and the Dean of the Graduate School, but in no case will this amount exceed one-third of the total requirements for the degree of Doctor of Philosophy.

Students carrying work at the Bureau of Juvenile Research must be registered in the Graduate School of this University during the time in which they are pursuing such work.

(f) **With the Battelle Memorial Institute.** Students who are registered in the Graduate School of The Ohio State University, specializing in certain fields of engineering, especially in metallurgy, fuels and allied fields, may carry on their research work at the Battelle Memorial Institute. The credit for such work must be submitted under the signature of the professor in charge of the work, who must be a member of the appropriate department of the University.

THE UNIVERSITY LIBRARY

The University Library consists of all books owned by the University and numbers approximately 445,000 volumes. The main part of the Library, which is known as the General Library, is housed in the Library Building. Very important divisions of the book collection are housed in other buildings. A catalog of the entire collection is maintained in the General Library.

Any person is privileged to use the University Library for reference, but books may be drawn for home use only by officers and registered students of the University.

The University Library is a depository for the official publications of the United States and has a very complete collection of these documents. It also receives thousands of documents from states, cities, and foreign countries. The Library also possesses the British Parliamentary Papers including the rare early volumes. The numerous series of the publications of the League of Nations are well represented in the Library Collections. The exchanges of the Ohio Academy of Science, of the Ohio State University Scientific Association and of the Ohio Biological Survey are deposited in the University Library.

Through a gift from the Phi Eta Sigma fraternity, the General Library has established a rental library of significant current books for general reading. Its popularity suggests that this project fills a recognized need.

The University Library is a depository for the Library of Congress catalog.

Twelve department libraries, organized divisions of the University Library, are in charge of library assistants.

The Botany and Zoology Library is located in the Botany and Zoology Building. The "Index to General Botanical Literature," the "Index to Algological Literature" and the card index to the Concilium Bibliographicum are in this departmental library.

Brown Hall Library, located in Brown Hall, contains collections of books on Architecture, Engineering Drawing, and Civil Engineering. The collection of plates filed in this library is especially valuable for students in Architecture.

The Charles Cutler Sharp Library is located in the Chemistry Building. It contains not only the current periodicals and a large collection of dictionaries and handbooks on chemistry, but also complete sets of all important journals dealing with subjects lying within the general field of chemistry and related sciences.

The Commerce Library, in the Commerce Building, includes a working collection of books for the undergraduate students in the College of Commerce. A large study room is maintained and also a reserve collection for student use.

The Education Library is located in the Education Building. It is organized for graduate work and includes complete sets of important educational and psychological periodicals, city and state reports, textbooks, and other works of reference on educational and psychological subjects.

The Law Library is in Page Hall. It includes all of the United States and state reports, the English reports, the Irish reports, the latest statutes, codes and session laws of the states, complete sets of all the important legal periodicals and an up-to-date collection of text-books. It is especially well equipped for the study of Ohio law.

The Lord Hall Library consists of collections of books on Ceramics, Mining, Metallurgy, and Mineralogy and is located in Lord Hall.

The Medical and Dental Library is in Hamilton Hall. It consists of a working collection of books and periodicals. The historical books and many of the foreign periodical sets are shelved in the General Library.

The Orton Memorial Library, located in Orton Hall, is one of the finest geological libraries in the country. In addition, the Ohio Geological Survey deposits its document exchanges with the library. These two collections constitute a very complete set of official geological reports from the states, foreign governments, and scientific societies.

The Pharmacy-Bacteriology Library is located on the first floor of the Pharmacy and Bacteriology Building. It comprises files of journals and selected titles in pharmacy and bacteriology designed to furnish a reference collection for the students in these departments.

The Alfred D. Cole Memorial Library of Physics occupies two rooms in the Mendenhall Laboratory of Physics. The nucleus of the collection is the private library of Professor Cole, supplemented by files of journals and selected titles in the field of physics, transferred to this collection from the General Library. A memorial endowment fund contributed by friends of Professor Cole will ultimately provide for additions to this Library. The books and journals in the field of mathematics are shelved at present in the Cole Memorial Library rooms for the mutual convenience of the two departments.

Smaller collections selected with special reference to the needs of the various departments are housed near their offices. Collections of this type have been developed for Political Science, Room 100, University Hall, Veterinary Medicine in the Veterinary Laboratory, Journalism on the second floor of the Journalism Building, Agriculture in Room 309, Main Library. The books relating to the Department of Fine Arts are collected in the Mantel Room in the General Library, where students have every facility for research.

The Library of the Ohio Archaeological and Historical Society, which is on the University Campus, is at the service of the officers and students of the University. This library is specializing in the history of Ohio and the Northwest and a very valuable collection is being built up. Its large newspaper collection is one of the most valuable in the Middle West.

The special library of Battelle Memorial Institute and the collections of the State Library are open to faculty and students of the University and supplement in important fields the collections of the University Libraries.

THE STATE LIBRARY

The State Library, consisting of approximately 600,000 volumes, is also available and is especially valuable in certain lines of work.

TEACHERS' PLACEMENT SERVICE

The Ohio State University maintains a Teachers' Placement Service for the convenience of the Superintendents and Boards of Education of the State. Graduates and graduate students of the University are invited to enroll with the Appointments Office.

The Placement Service is under the direction of the Bureau of Educational Research. This service is rendered free of charge to the applicants. Graduates of experience who desire to better their locations are invited to communicate with the Appointments Office.

The Appointments Office has available such statistical information that advice and direction may be given in the matter of supply and demand for teachers in their various fields.

The service offered will be rendered on the exact basis of merit.

Superintendents and Boards of Education are invited to state their needs to the Appointments Office. Prompt attention to all calls is assured.

UNIVERSITY HEALTH SERVICE
Hayes Hall

Medical Staff: Dr. John W. Wilce, Director; Dr. M. F. Osburn, Dr. J. M. Foley, Dr. James A. Beer, Dr. Shirley Armstrong, Dr. Charlotte Winnemore, four occasional clinical and examination assistants, eight specialized occasional consultants.

Office Hours. When the University is in session, daily 8:30 to 12:00 and 1:00 to 4:30; Saturday, 8:30 to 12:00. Phone: Campus 461.

The objects of the University Health Service are:

(1) To protect, maintain, and improve the health of students by cooperation in entrance examination; early diagnosis and control of all contagious conditions, in cooperation with government and other university health agencies; individual health guidance, through personal conference; first aid and casual treatment of students on the campus; periodic health examinations for seniors, food-handlers, and special cases; consultant specialist service for certain cases; full cooperation with family physician, other physicians, and health agencies; centralized correlation of other health agencies on the campus; maintained emphasis of preventive medicine.

(2) To serve as the primary coordinating agency with University Personnel officials in individual student health appraisal and health problems which involve the maintenance, discontinuance, or improvement of students' university relationships.

(3) To furnish a limited degree of hospitalization for observation, diagnosis, or treatment of emergency conditions, when in the judgment of University Health Service physicians it is thought necessary. (Responsibility for special hospital treatment is not assumed by the University Health Service.)

STUDENT AUTOMOBILES

The University does not bar the use of automobiles by students. However, students can be given only very limited parking space on the campus, and the use of autos is discouraged. Unless the student drives a long distance to and from his home each day or is physically incapacitated, he does not need a car while attending the University. The cooperation of parents in this matter is earnestly desired.

FEES AND EXPENSES

Registration is not complete until all fees have been paid. No student will have any privileges in the classes or laboratories until all fees and deposits are paid.

Since all fees are due and payable as a part of the student's registration, before the day designated in the University Calendar for classes to begin, no person should come to the University for registration without money sufficient to cover all of his fees and deposits.

A penalty of $5.00 for each succeeding day or fraction thereof will be assessed for failure to comply with this rule except in the case of a new student granted permission by the Dean of his College to register after the opening of the University.

1. Matriculation fee (non-returnable)
   Required of every student on *first admission to the University* $15.00
2. Incidental fees
   Incidental fees do not vary with the number of courses taken
   Quarter fee for a resident of Ohio..... 20.00

Quarter fee, including non-resident fee, for a non-resident of Ohio 70.00

3. Special fees

(a) General Activities fee..... 4.00

(b) Laboratory Breakage deposit—amount varies with course.....from 1.00 to 20.00

Students are required to pay for all materials consumed in laboratory work. The laboratory deposit must be made at the time of registration before the student may enter the laboratory. All laboratory supplies are sold to students at the Laboratory Supply Store, Chemistry Building, and charged against the deposits (See page 16). Instructors shall not permit students to engage in laboratory work unless the student has shown a receipt from the Bursar for deposit paid

(c) Abstract fee

The abstracts of Masters' theses and Ph.D. dissertations are published in the form of a journal at the end of each Quarter and a special fee for editing, printing, and binding these abstracts is required for each person receiving such a degree from this University. This fee must be paid not later than one week *before* the commencement date on which the candidate expects to receive his degree

Abstracts of Masters' theses..... 5.00

Abstracts of Ph.D. dissertations..... 50.00

NOTE: When checks given for payment of fees are not paid on presentation at bank, registration will be automatically cancelled and receipts given considered null and void.

NON-RESIDENT FEE

Every student who is not a legal resident of the State of Ohio is required to pay a non-resident fee of $50.00 each Quarter (or $25.00 each term of the Summer Quarter) of his residence in the University in addition to other University fees. The burden of registering under proper residence is placed upon the student. If there is any possible question of his right to legal residence the matter should be brought to the attention of the Registrar and passed upon, previous to registration or the payment of fees. Any student who registers improperly under this rule shall be required to pay not only the non-resident fee but shall be assessed a penalty of $10.00. Students who do not pay this fee within thirty days after they have been notified that the non-resident fee has been assessed against them, will have their registration in the University cancelled.

No person shall be considered eligible to register in the University as a resident of the State of Ohio unless he has been a *bona fide* resident in the State twelve consecutive months next preceding the date of his original enrollment, and no person shall be considered to have gained or lost a residence in this State for the purpose of registering in the University by any conduct of his own while he is a student in the University, unless after attendance at the University for one year it can be clearly established by the student that his previous legal residence has been abandoned and a new one established in Ohio for purposes other than merely attending the University; but persons whose legal residence follows that of other persons, as hereinafter provided, shall be considered to have gained or lost legal residence in this State for such purpose

while students in the University according to changes of legal residence of such other persons, except that such legal residence shall not be considered to be so gained until twelve months after such other person becomes a legal resident of this State.

MINORS: The residence of minors shall follow that of the legal guardian. regardless of emancipation; but in case a resident of Ohio is appointed guardian of a non-resident minor, the legal residence of such minor for the purpose of this rule shall not be considered to be established in the State of Ohio until the expiration of twelve months after such appointment.

WIVES: The residence of wives shall follow that of husbands.

ALIENS: Aliens who have taken out their first citizenship papers and who have been residents of Ohio for twelve months next preceding the date of their original enrollment in the University, shall be regarded as eligible for registration as residents of Ohio.

ROOM AND BOARD

Room and Board. (See Living Arrangements, page 20.)

RETURN OF FEES ON WITHDRAWAL

Fees are returnable in case a student withdraws on account of sickness or for other causes entirely beyond his control, if such withdrawal is made during the first thirty days of the Quarter. Students withdrawing under request from the University are not entitled to any return of fees. Permission to withdraw, given in writing by the Dean of the College, must be presented to the Bursar within this thirty-day period. Ordinarily no more than one-half of the fees paid will be refunded; if the case has exceptional circumstances it should be referred to the President for his judgment.

No fees will be returned in case of withdrawal of students until thirty days have elapsed from the date of withdrawal.

If fees are paid under mistake of law or fact they are returnable in full.

Fees are not returnable except as provided in this rule.

On Laboratory Deposits. If a student is forced to withdraw from a laboratory course during a Quarter, he must first secure permission from his Dean.

No portion of a laboratory deposit of $5.00 or less shall be returned, unless the course is officially dropped by the student and request for refund presented within thirty days after the payment of the deposit.

On a laboratory deposit of $6.00 or more the unexpended part of the deposit is returnable if called for on or before the close of the Spring Quarter of the fiscal year in which the deposit has been made.

An order for refund for the unexpended portion of the deposit may be obtained by applying at the Laboratory Supply Store, Chemistry Building. The unexpended part of the deposit will be paid at the Bursar's Office on presentation of the order for refund.

SPECIAL FEE—PENALTY

PENALTY FOR FAILURE TO KEEP APPOINTMENT FOR PHYSICAL EXAMINATION

A fee of $1.00 will be assessed for failure to keep appointment for Physical Examination or for change in date of Physical Examination.

STUDENT PERSONAL EXPENSE FUNDS

The incoming student will save himself much time and trouble by taking a few simple precautions in regard to his personal expense money. The student should bring enough cash to cover all expenses for several days. If he does not wish to carry cash, he should use travellers checks, as they are readily

cashed. If he does bring a check, it should be in the form of a bank draft or cashier's check. The student who has a check should not wait until he has spent all his money before cashing the check for it may take several days to collect it. Be sure that any checks that are for the payment of fees are drawn for the exact amount of the fees.

The following facts concerning the cashing of checks should be borne in mind by parents and prospective students.

(a) The Ohio State University does not cash checks.

(b) Checks for fees will be accepted by the University, but only when the check is drawn for the exact amount of the fees.

(c) Banks do not cash checks for strangers unless the check is endorsed by a customer of the bank or some person of known responsibility. This rule applies to cashier's checks, bank drafts, and certified checks.

The student who intends to use a checking account will find that an account in Columbus will be of more value than an account at home or in some other city. An account with a Columbus bank will provide a safe place for depositing funds, will help create a local credit standing, will furnish a means of depositing and cashing checks, and will help the student to understand banking practices.

ASSISTANTSHIPS, FELLOWSHIPS, AND SCHOLARSHIPS

GRADUATE ASSISTANTSHIPS OPEN TO GRADUATE STUDENTS

In order to encourage graduates of this University and of other similar and approved institutions, especially those in Ohio, to continue their studies and to pursue advanced work leading to the higher degrees, the University has established graduate assistantships in several departments. Graduate assistants must be registered in the Graduate School as candidates for a graduate degree. They are elected for the year—four Quarters. During three Quarters, generally the Autumn, Winter, and Spring Quarters, they must devote approximately one-third of their time to assisting in the work of the department in which they are specializing; during the remaining Quarter the graduate assistants are free to carry on their work at the University or elsewhere. Each graduate assistant must confer with the chairman of the department in which he is specializing concerning the Quarters that he must be in residence. A graduate assistant receives a stipend of $450, payable in nine monthly installments during the three Quarters in which he is rendering service. In addition, all fees are remitted except a matriculation fee of $15.00. If a graduate degree is obtained, the assistant must also pay a fee for printing the abstract of his thesis or dissertation ($5.00 in the case of the Master's degree and $50.00 in the case of the degree of Doctor of Philosophy).

Students desiring to apply for graduate assistantships in any academic year *must present their applications not later than March 1 of the preceding year.* Application blanks may be obtained upon request by addressing the chairman of the department in which the candidate desires to secure such an assistantship.

UNIVERSITY SCHOLARSHIPS AND FELLOWSHIPS

In addition to the graduate assistantships, a limited number of scholarships and fellowships have also been established. The scholarships are open to students having a baccalaureate degree from an approved institution, and have a value of $250 with exemption from all fees, except the matriculation fee of $15.00. The fellowships, on the other hand, are open only to students who have at least the Master's degree or its equivalent, and have a value of $400 with like exemption from all fees, except the matriculation fee. If a

graduate degree is obtained, a scholar or a fellow must pay a fee for printing the abstract of his thesis or dissertation ($5.00 in the case of the Master's degree and $50.00 in the case of the degree of Doctor of Philosophy).

Scholars and fellows are selected on a basis of merit, irrespective of the departments in which they wish to work, and must devote all their time to graduate work, including research. They are elected for the year, four Quarters, but are required to be in attendance only three Quarters, generally the Autumn, Winter, and Spring Quarters, during the year. Candidates for these positions for the year 1936-1937 must file their applications not later than March 1, 1936. Application blanks may be obtained by addressing the Dean of the Graduate School. Appointments are made annually on April 1 in accordance with the regulations of the Association of American Universities, of which Association the University is a member.

SPECIAL FELLOWSHIPS

THE ELIZABETH CLAY HOWALD SCHOLARSHIP

This scholarship, endowed by the late Ferdinand Howald, an alumnus of The Ohio State University, in memory of his mother, Elizabeth Clay Howald, carries a stipend of $3000 payable in twelve monthly installments.

Any person who has shown marked ability in some field of study and has in progress work, the results of which promise to constitute important additions to our knowledge, shall be deemed eligible to appointment to this Scholarship.

The scholar will be expected to devote his time uninterruptedly to the pursuit of his investigations. If he has ever been a student of The Ohio State University or a member of the University staff, he may carry on his investigations either at The Ohio State University or, subject to the approval of the Graduate Council, elsewhere either in this country or abroad where superior advantages for his particular field of study are available. If the scholar has never had any connection with The Ohio State University, however, then he must carry on his investigations at The Ohio State University.

Applications must be filed with the Dean of the Graduate School not later than March 1. The appointment will be made on April 1 and the term of appointment will begin July 1 and extend to July 1.

Prospective candidates may secure application blanks by addressing the Dean of the Graduate School.

THE STILLMAN W. ROBINSON FELLOWSHIP

The fellowship endowed by Stillman W. Robinson, late Professor of Mechanical Engineering, for the encouragement of graduate research in engineering, has an annual value of $750, and is open to graduates in Mechanical, Civil, and Electrical Engineering.

The holder of the fellowship must devote his entire time to graduate work. This should lead to the Master's or the Doctor's degree under the general regulations which obtain in reference to these degrees. For further information, or for application blanks, address the Dean of the Graduate School or the Secretary of the College of Engineering.

All applications should be filed with the Dean of the Graduate School not later than March 1.

THE NATHANIEL WRIGHT LORD FELLOWSHIP

The fellowship endowed by William Bartlett Calkins, an alumnus of the University, in memory of Nathaniel Wright Lord, late Professor of Metallurgy, has an annual value of $750. This fellowship was established to encourage graduate research on solid fuels or products derived from solid fuels which have a practical application in the industrial world.

The holder of the fellowship must devote his entire time to graduate work. This should lead to the degree of Master of Science or Doctor of Philosophy, under the general regulations which obtain in reference to these degrees. For

further information or for application blanks address the Dean of the Graduate School.

All applications should be filed with the Dean of the Graduate School not later than March 1.

THE BATTELLE MEMORIAL INSTITUTE FELLOWSHIPS

The Battelle Memorial Institute of Columbus has established one or more fellowships at The Ohio State University. Each fellowship carries an honorarium of $60.00 per month for ten months, September to June inclusive. All course work selected by the fellow will be taken at The Ohio State University, while the research work will be carried on at The Battelle Memorial Institute. Inasmuch as this institute was founded for the purpose of studying the application of science to industries, especially in Metallurgy, Fuels and allied fields, the candidate's research work must be in this general field. Ordinarily each fellow will be a candidate either for the degree of Master of Science or Doctor of Philosophy, and will devote his entire time to graduate work, including research.

Candidates may secure application blanks by addressing the Dean of the Graduate School. All applications should be received not later than March 1 of each academic year.

EDWARD ORTON JUNIOR CERAMIC FOUNDATION FELLOWSHIPS

Under the provisions of the will of the late Edward Orton, Jr., the Edward Orton Junior Ceramic Foundation has established two fellowships having an annual value of $1000 each. Of this amount $750 is the stipend of the Fellow and $250 is used for the purchase of apparatus and materials. The holders of these fellowships are expected to devote their entire time to graduate courses and research work in the field of ceramics under the general direction of the Department of Ceramic Engineering and ordinarily will be candidates for either the Master of Science or the Doctor of Philosophy degree.

THE MARGARET G. HARDER PAN-AMERICAN SCHOLARSHIP

In May, 1930, the Ohio Federation of Women's Clubs established a scholarship to be known as the Margaret G. Harder Pan-American Scholarship. This scholarship carries an honorarium of $800.00 payable in monthly installments, and in addition the holder of the scholarship is allowed the same exemption of fees as are the University Scholars and Fellows.

The scholarship is open to women graduates of reputable South American Colleges and Universities. For further information concerning this scholarship address Mrs. William N. Harder, 434 East Church Street, Marion, Ohio.

E. I. duPONT de NEMOURS AND COMPANY POST-DOCTORATE FELLOWSHIP

The E. I. duPont de Nemours and Company of Wilmington, Delaware, has established for the year 1936-1937, a post-doctorate fellowship for research in the field of cellulose chemistry. All applicants must hold the degree of Doctor of Philosophy. The stipend is $2000 for the year. Applications must be filed with the Chairman of the Department of Chemistry.

THE JOHN A. BOWNOCKER FELLOWSHIP

The fellowship provided from funds bequeathed by John A. Bownocker, an alumnus of the University and late Professor of Geology, has an annual value of $750.

The holder of the John A. Bownocker Fellowship must register in the Graduate School of The Ohio State University and must devote his entire time to graduate work and research in the field of geology. This should lead towards the degree of Doctor of Philosophy under the general regulations which obtain in reference to this degree. For further information, or for application blanks, address the Dean of the Graduate School.

All applications must be filed with the Dean of the Graduate School not later than March 1. Appointments will be made April 1.

HONORARY FELLOWSHIPS

Persons who have already received their Doctor's degree and wish to carry on research work may be appointed Honorary Fellows. Honorary Fellowships carry no honorarium but persons holding these fellowships are given the complete freedom of the University and are exempt from the payment of all fees, but will be required to pay the cost of any materials consumed in the pursuit of their research. Honorary Fellows are not permitted to take courses for credit.

INDUSTRIAL FELLOWSHIPS

A number of industrial fellowships are established each year by various organizations and societies, for the purpose of carrying on research work in definite fields of investigation. Some idea can be gained concerning these fellowships from the following list which have been filled in the present year:

1 National Aluminate Corporation Fellowship in Chemistry;
1 S. M. A. Corporation Fellowship in Bacteriology;
1 Kraft-Phenix Cheese Corporation Fellowship in Dairy Technology;
1 United States Potters Association Fellowship in Ceramic Engineering.

LIVING ARRANGEMENTS

The President of the University has the authority to supervise living arrangements of students not residents of the city of Columbus and to order the immediate withdrawal of any student from any boarding or lodging house in which the surroundings are undesirable.

ROOMS AND BOARD FOR MEN

Furnished rooms can be obtained at prices varying from $7.00 to $15.00 a month (single) and $10.00 to $20.00 (double). The cost of the table board in the clubs and restaurants near the University is from $4.00 to $6.00 a week. Board can be secured at the Ohio Union, as well as at Pomerene Hall, at reasonable prices.

Board with furnished rooms can be obtained in private families within convenient distance from the University at rates varying around $7.00 a week.

MEN'S DORMITORIES

The University possesses only two dormitories for men, the Tower Club and the Buckeye Club. The Clubs were organized for men who are in great need of financial assistance and no others should apply for admission.

Applicants with unusually good records in the high school and advanced students who have made unusually good records in college are eligible for consideration.

The clubs are run on a cooperative dormitory plan with very simple accommodations. The Club fee is $1.00 a Quarter for each man. Board is available at approximately $2.90 a week.

Applications should be sent to B. L. Stradley, University Examiner.

MEN'S HOUSING BUREAU

The absence of dormitories for men at The Ohio State University, with the exception of the Tower Club and the Buckeye Club, makes it necessary for the men students to reside in private rooming houses in the University district. In order to assist the students (especially those entering for the first time) in finding desirable rooms at the greatest saving, the University has created the

Men's Housing Bureau, located in the office of the Dean of Men, first floor, Administration Building.

Classified lists of rooms available for every student and for any number of students are always available at this office. Boarding houses are likewise listed.

If the student signs the "Rooming House Agreement" he shall be expected to be responsible for the rental price of the room as specified in the agreement, unless he can present satisfactory reasons to the Men's Housing Bureau for moving out before the expiration of that period, or, unless he can secure a satisfactory substitute. If he moves out before the expiration of the Quarter without presenting a satisfactory excuse he shall forfeit one month's rent. The signing of such agreement is optional.

The University warns students not to rent rooms that have not been placed on the approved list by the Men's Housing Bureau. Any one renting a room which is not on the approved list does so at his own risk.

WOMEN STUDENTS

The Ohio State University is open to women upon the same conditions and by the same methods of registration offered to men. Every woman student, whether undergraduate or graduate, must register with the Dean of Women at her office in Pomerene Hall during the first four days of each Quarter. The exact dates of registration will be fully announced each Quarter.

LIVING ARRANGEMENTS FOR WOMEN

All living arrangements for women are under the supervision of the Dean of Women. Applications for residence in the residence halls and private rooming houses should be made directly to the Dean of Women. A limited number of graduate women can be accommodated in these types of residence.

UNIVERSITY RESIDENCE HALLS FOR WOMEN

The three University Residence Halls are known as Oxley, Mack, and Neil Halls. All three Halls are governed by student government with the advice and supervision of the House Superintendent. Booklets describing these residence halls will be sent upon request to the Superintendent. Students living in these residence halls shall not change to another residence at any time during the year without the previous consent of the Dean of Women.

PRIVATELY OPERATED RESIDENCE HALLS AND UNIVERSITY HOUSES FOR WOMEN

Westminster Hall, 52 Fifteenth Avenue, under the supervision of the Presbyterian Church and St. Hilda's Hall, 169 West Eleventh Avenue, under the supervision of the Episcopal Church are open as places of residence to women students. Students living in these residence halls shall not change to another residence at any time during the year without the previous consent of the Dean of Women. Booklets describing Westminster Hall and St. Hilda's Hall will be sent upon request to the Superintendents. There are also about twenty-five University houses, privately owned and operated, under the supervision of the Dean of Women. Full information and prices may be obtained upon request to the Dean of Women.

OTHER ARRANGEMENTS

A list of light housekeeping rooms and apartments is available to graduate women in the office of the Dean of Women. A list of rooms in private homes is also available. Graduate women are not permitted to live in any house where men students live.

ADMISSION

METHOD OF ADMISSION

The admission of students is in charge of the University Entrance Board, which determines the credits that shall be issued on all entrance examinations and certificates, and furnishes all desired information to applicants. Correspondence relating to admission should be addressed to the University Examiner, The Ohio State University, Columbus.

REQUIREMENTS FOR ADMISSION

Admission to the Graduate School is open to all graduates of The Ohio State University as well as to the graduates of all other colleges and universities of approved standing, *provided their undergraduate records are satisfactory.* Before entering upon graduate work in any department, the applicant must present evidence to the effect that he has had the necessary prerequisite training that will enable him to pursue with profit the courses desired. *It must be remembered also that admission to the Graduate School does not imply admission to candidacy for the degree.* No graduate student, not even one who is a graduate of The Ohio State University, is admitted to candidacy for a degree until he has been in residence a sufficient time to enable his instructors to judge of his ability to carry on graduate work.

Information concerning admission to candidacy will be found under the headings "Requirements for the Degrees of Master of Arts and Master of Science" and "Requirements for the Degree of Doctor of Philosophy."

A graduate of a college not on the approved list may be admitted to the Graduate School, provided that his college course, when checked by the University Examiner, entitles him to a credit of not less than one hundred and thirty-five Quarter-credit hours, or ninety semester hours. In all such cases, however, the residence and hour requirements for the graduate degree will be correspondingly increased.

METHOD OF PROCEDURE FOR ADMISSION

An applicant for admission to the Graduate School must first secure a statement from the registrar or other officer of the university or college of which he is a graduate, which contains the following information: (1) the date of graduation of the applicant; (2) the degree received; (3) a complete list of courses taken and grades received. This transcript, together with a catalogue of the institution of which the applicant is a graduate, should be sent to the University Entrance Board not later than three weeks (an earlier date is preferable) before the opening of the Quarter in which the applicant expects to register. If the credentials are satisfactory, an admission card to the Graduate School will be mailed promptly to the applicant. If the credentials are not satisfactory or if further information is desired, the applicant will be notified at once by correspondence.

In case the applicant finds it impossible to send by mail the statement referred to in the preceding paragraph, he may present it in person when he reports for registration and receive his admission card. However, the office of the Entrance Board is always crowded on the opening days of the Quarters, so that the applicant will find it greatly to his advantage to secure his admission card in advance by correspondence.

METHOD OF PROCEDURE FOR REGISTRATION

The method of procedure for registration is as follows: The student, having secured from the University Entrance Board his admission card to the Graduate School, will present this card at the Office of the Graduate School in Room 106, University Hall. Here he will be given a course of study card and will be instructed as to the further method of procedure for registration. This procedure will include the appointment of an adviser who will assist the student in mapping out, and entering upon the course of study card, a suitable course of study. The adviser will signify his approval of the course of study by signing the card in the appropriate place. While it is advisable to map out, tentatively at least, all the work for the degree in question, nevertheless, it is sometimes impossible to do this and only the work proposed for the year or for the Quarter is entered. The work for the degree, or for the year or Quarter, having been entered upon the course of study card, the student will then return the card to the office of the Graduate School and will receive his schedule card properly filled out and approved. The student will then immediately report to the Registrar's office in the Administration Building and obtain his fee card. He will then pay his fees at the office of the Bursar in the Administration Building. Registration is not complete until the fees have been paid. Even a student who for any reason is exempt from the payment of fees, must report to the Bursar's office and have his fee card stamped. All fees and laboratory deposits required by a student must be paid to the Bursar before the student is entitled to enter his classes.

No student is permitted to change his adviser without the approval of the Dean of the Graduate School.

CHANGES IN COURSE

After a student's election card has been made out for the year, or Quarter, changes in his course of study will be made only upon the written request of the student's adviser, and the statement embodying the reasons for such changes must be left on file with the Dean of the Graduate School. No credit will be given on the University records for courses taken without the proper authorization.

DATE OF REGISTRATION

Registration for any Quarter is permissible at any time during the two-weeks period previous to the opening day of the Quarter. If at all possible a student should register some time during this period. Students who find it impossible to register before the opening day of the Quarter will be allowed to register later within a reasonable length of time under such restrictions as the Dean of the Graduate School deems wise. In no case will a student be allowed to register late for a course without first obtaining the written permission of the instructor giving the course. Any student desiring to pursue research work only may be permitted to register at any time during the Quarter provided he first obtains the written permission of the instructor in charge of the work.

A student who is exempt from the payment of fees under the regulations of the Board of Trustees must complete his registration promptly in order to obtain such exemption.

STUDENTS TRANSFERRING TO A COLLEGE IN THE UNIVERSITY

A student who desires to transfer from the Graduate School to a college of this University must make his application for such transfer to the University Examiner. This transfer must be approved by the University Examiner before the student will be permitted to proceed with his registration in the college which he is proposing to enter.

WITHDRAWAL FROM THE UNIVERSITY

A student who desires to withdraw from the University must apply to the Dean of the Graduate School for permission to withdraw in good standing. *If the student leaves the University at any time during the Quarter, without communicating with the Dean, he will be marked as having failed in all of his courses for the Quarter.* If a personal interview is impossible, the Dean must be notified by mail. In order to retain his right to voluntary return, the reasons given for withdrawal must be satisfactory to the Dean, and must be so endorsed at the time the application is filed.

The written permission of the Dean shall be filed with the Registrar at once by the Secretary that the proper entry may be made upon the University records.

COMBINATION ARTS AND SCIENCES-GRADUATE COURSE LEADING TO THE TWO DEGREES, BACHELOR OF ARTS AND MASTER OF ARTS

In accordance with an agreement made between the College of Arts and Sciences and the Graduate School, it is possible for students of exceptional ability to secure both the Bachelor of Arts and Master of Arts degrees by an extra Quarter of study in addition to the regular four-year period ordinarily required for the degree of Bachelor of Arts. Indeed, by the proper planning of the sophomore and junior schedule of study, it is even possible to secure both of these degrees in four years.

Admission to the Combination Arts and Sciences-Graduate course is limited to those students in the College of Arts and Sciences who have completed all junior division requirements and at least one hundred and forty-five Quarter hours of work with a point ratio of not less than 3.5.

Students who are eligible and wish to apply for admission to this combination course must do so as soon as they have finished the junior requirements. Such students should report to the office of the College of Arts and Sciences or to the Graduate School for detailed information as to method of procedure.

CREDIT TOWARDS A MASTER'S DEGREE FOR COURSES REQUIRED FOR THE PROFESSIONAL DEGREES IN THE COLLEGE OF DENTISTRY AND IN THE COLLEGE OF MEDICINE

Students admitted by the University Examiner to both the Graduate School and either the College of Dentistry or the College of Medicine may offer not to exceed 15 Quarter hours of work required for either the D.D.S. or M.D. degree towards the Master's degree, or 45 Quarter hours towards the Ph.D. degree, this number to include the 15 Quarter hours already allowed for the Master's degree. In order to be eligible for double registration the candidate must have an average of not less than "B" in courses taken in the field of specialization. In order to register in this double curriculum the candidate must first secure an admission card from the University Examiner. This admission card must be presented at the office of the Graduate School where a course card will be made out for him. He must then present the same to the Chairman of the department in either the College of Dentistry or the College of Medicine in which he wishes to major. The Chairman, after consultation with the candidate, will map out the course proposed for the Master's or the Ph.D. degree, which may include the number of Quarter hours of Medical or Dental work referred to above, and sign the card, thus indicating his approval of the course. The candidate will then return the card to the office of the Graduate School. If the course so selected meets with the approval of the Dean of the Graduate School, the candidate will be registered in the Graduate School as well as in the appropriate professional college. In order to secure such double credit the

candidate must receive a grade of "B" or better in the courses required for the Medical or Dental degrees.

DEGREES CONFERRED

The following higher degrees are conferred by the University: Master of Arts, Master of Science, Master of Business Administration, Master of Arts in Social Administration, Master of Science in Public Administration, Doctor of Philosophy. The requirements for the Master's degree will be found on pages 27-32 and for the degree of Doctor of Philosophy on pages 32-34. All candidates must read these requirements carefully.

GRADUATE STUDENTS NOT CANDIDATES FOR A DEGREE

Graduate students who are not candidates for a higher degree are designated as "Special Students" and are not required to name a field of specialization, but may elect their work with a view to the special purpose for which they are in attendance at the University. Any course of study announced for advanced undergraduates and graduates is open for election by such students upon the same conditions that are imposed upon those who are candidates for degrees.

Should a graduate student who has not arranged his work with a view to obtaining a degree, subsequently desire to become a candidate for a degree, the amount of credit he is to receive for work already done will be determined at the time he applies for admission to candidacy for the degree.

REGISTRATION DURING THE QUARTER IN WHICH THE DEGREE IS SOUGHT

A candidate for any graduate degree must be registered in the Graduate School during the Quarter in which he expects to come up for the degree. Under exceptional conditions this requirement may be waived by the Graduate Council.

GRADING SYSTEM FOR GRADUATE STUDENTS

The work of all graduate students performed in connection with the development of theses and dissertations is reported simply as "Prog" indicating progress. All other work is reported as "A" Excellent, "B" Good, "C" Average, "D" Poor, "E" Failed. In order to receive graduate credit, a student must receive a grade of either "A" or "B" in not less than two-thirds of his work. No credit is given for courses in which a grade lower than "C" is received.

Occasionally, for various reasons, a graduate student may receive a grade of "Incomplete" in a course with the privilege of finishing the work later on. In all such cases, however, this "Incomplete" must be made up within a period of twelve months after the close of the Quarter in which the "Incomplete" was received, or no credit will be allowed for the course.

All graduate students registered in "600" courses shall be required to complete a certain amount of work in addition to that required of undergraduates. This may consist of reading additional books on the subject and presenting a review of same, the presentation of reports, or of such other work as the instructor in charge of the course may deem wise.

TOTAL CREDIT THAT MAY BE RECEIVED IN ANY ONE QUARTER

A graduate degree stands for concentration in a limited field of study. While a candidate for a degree may carry courses in excess of fifteen Quarter hours, nevertheless, *the maximum credit towards a graduate degree that may be obtained in any one Quarter is fifteen hours.*

CREDIT HOURS FOR PART-TIME ASSISTANTS

The maximum credit toward a graduate degree that may be obtained in any one Quarter (a) by an assistant is ten hours, (b) by a graduate assistant, twelve hours. The maximum credit that may be obtained by members of the teaching staff other than graduate assistants and assistants will be decided in each case by the Dean of the Graduate School and the student's adviser.

SENIORS TAKING COURSES FOR GRADUATE CREDIT

A Senior whose full time is not required for the completion of work for his baccalaureate degree may select certain courses for graduate credit, *but in order to do this the permission of the Graduate Council must be obtained before registering for the courses.*

GRADUATE WORK IN THE SUMMER QUARTER

Candidates for the Master's degree may complete the residence requirement for such a degree by pursuing graduate work at the University for three full Quarters. For the benefit of those who cannot stay during the entire Summer Quarter, this Quarter is divided into two equal terms; and candidates for the Master's degree may complete their residence requirement by pursuing graduate work for *four* summer terms, provided that in the *ad interim* periods between the Summer Quarters fifteen Quarter hours of satisfactory work are completed under the direction of one or more members of the instructional staff of the department in which the student is specializing. The amount of such work that will be credited towards any advanced degree is limited to fifteen Quarter-hours, and the amount during any one *ad interim* period to eight Quarter-hours. Hence, under this plan the four terms cannot be taken in two Summer Quarters.

No student is allowed to pursue *ad interim* work unless he has been in residence in the Graduate School of this University at least one term of a Quarter. Moreover, it is optional with any member of the instructional force as to whether or not he will conduct such work.

A student who wishes to pursue *ad interim* work will proceed as follows: Before the close of the Summer term in which he is in residence he will obtain from the office of the Graduate School an appropriate card and, after consultation with the professor in charge of the proposed *ad interim* work, will enter upon this card a brief outline of the work to be pursued in the *ad interim* period. After securing the signature of the professor thus signifying his willingness to conduct the proposed *ad interim* work, the student will deposit this card in the office of the Graduate School. As an evidence of earnest intentions, he must also register in the University (this does not imply attendance) for at least one Quarter of each period during which the *ad interim* work is being pursued. He is also required to report to the professor conducting his work at least once a month and to pass such examinations as may be prescribed. He may borrow from the University Library such books as may be necessary for the successful conduct of the work, but will be required to pay for the cost of shipment. Requests for such books should be sent to the Dean of the Graduate School.

OFF-CAMPUS RESEARCH WORK

A student who for any reason desires to carry on off-campus research work in connection with his thesis or dissertation must have his program approved in advance by the appropriate department and by the Graduate Council and must maintain his registration in the Graduate School during this entire period, and must pay the regular fees. No student may carry off-campus research work unless he has been in residence in the Graduate School of this University for at least one Quarter.

THE FRANZ THEODORE STONE LABORATORY
(Formerly The Lake Laboratory)

The Franz Theodore Stone Laboratory on Gibraltar Island, Put-in-Bay, Ohio, affords exceptional opportunities for graduate students who wish to carry on research work in botany, entomology, and zoology during the summer. The general rules that apply to graduate work carried on at the University during the Summer Quarter apply equally to the graduate work taken at the Laboratory. The work of instruction is carried on by members of the University Faculty and by members of the faculties of other colleges and universities. Students interested in this work should send to the University Examiner for the Franz Theodore Stone Laboratory Bulletin.

REQUIREMENTS FOR THE DEGREES OF MASTER OF ARTS AND MASTER OF SCIENCE

The degree of Master of Arts will usually be conferred upon candidates whose work lies in the departments properly included in the College of Arts and Sciences, the College of Education, or the College of Commerce and Administration, while the degree of Master of Science will usually be conferred upon candidates whose work lies in the College of Agriculture, the College of Engineering, the College of Medicine, or the College of Veterinary Medicine.

Residence Requirement. A residence of three Quarters or its equivalent wholly devoted to graduate work is required; however, a student may reduce this residence requirement to two Quarters (taken in four terms of different summer Quarters) by completing in a satisfactory way fifteen Quarter-credit hours of *ad interim* work as outlined on page 26. Moreover, a graduate of The Ohio State University may do not to exceed one-half of the required work at another institution having equivalent opportunities for study. The candidate is, however, subject to final examination by The Ohio State University on all work offered for the degree.

A student holding a graduate assistantship must spend at least six weeks in addition to the three Quarters, in order to fulfill the residence requirement. For a part-time assistant, a minimum residence of four Quarters is required, during one of which he must devote full time to his graduate work.

Students entering from other accepted graduate schools will be credited with work already completed, provided authorized statements are presented to the effect that such students have credit in the graduate school for the work specified. *However, no student will be given a degree by The Ohio State University unless he has satisfactorily completed forty-five Quarter-hours of work under the guidance of this University.*

A candidate for the Master's degree must be registered in the Graduate School during the Quarter in which he expects to receive the degree, unless excused in advance by the Graduate Council from such registration.

Course of Study. The course of study shall be selected in consultation with the student's adviser (see page 23). It must show a reasonable degree of concentration on interrelated subjects and must be pursued under at least two professors. The course of study outlined shall be subject to the approval of the Dean of the Graduate School.

While qualification for the Master's degree is not based entirely upon the completion of a definite number of hours of work, nevertheless, the amount of work required will usually aggregate not less than the equivalent of fifteen hours of classroom work throughout three Quarters, inclusive of the thesis. This presupposes that the student has completed the necessary prerequisites for graduate work in his chosen field.

Standard of Work Required. A graduate student doing acceptable work for the Master's degree must attain the mark "A" or "B" in not less than two-thirds of the work included in the course of study outlined for his degree, and the mark of "C" or higher in the remaining one-third.

Admission to Candidacy. A student desiring to be admitted to candidacy for a Master's degree must file his application for admission to candidacy for the degree with the Dean of the Graduate School at a date not later than two weeks after the opening of the Quarter in which the degree is sought. The applications are made upon special blanks secured from the office of the Graduate School. These applications are passed upon by the Executive Committee of the Graduate Council. Admission to candidacy is based upon undergraduate training and ability to pursue graduate work as revealed by the official reports upon the student's course. No student will be admitted to candidacy until he has completed at least the equivalent of one Quarter's work.

Examination. A student working for a Master's degree is required to pass the regular final examinations in all courses for which he is registered and must receive grades in accordance with the regulations of the Graduate School. A general comprehensive examination also is required to test the candidate's knowledge of the study which he has mainly pursued. This general examination is held after the submission and approval of the thesis; it is conducted by a committee composed of the candidate's adviser (chairman) and at least one other member of the instructional force chosen by him. The general examination may be either written or oral at the option of the examining committee. The chairman of the committee is responsible for arranging the examination and for certifying its results to the Dean of the Graduate School. The report of this committee must be unanimous in order to be considered satisfactory. However, when the examining committee consists of three or more members of the instructional staff, in case of a *single* dissenting vote, the case is automatically referred to the Executive Committee with power to act.

A candidate who fails in his general examination must register in the Graduate School and carry on work for an additional Quarter before an opportunity will be given for a second general examination, unless special permission is granted by the Graduate Council for an earlier examination at the request of the department concerned.

Thesis. A satisfactory thesis is required. The subject of the thesis, together with the written approval of the professor directing the work, must be filed in the office of the Graduate School at a date not later than that on which the student applies for admission to candidacy.

A candidate who expects to receive his degree at the end of a given Quarter must submit the completed manuscript of his thesis ready for typewriting to his adviser not later than three weeks prior to Commencement Day. If the manuscript is approved the candidate must at once prepare two typewritten copies of the same, following specifications which may be obtained at the office of the Graduate School. If the thesis is then approved the candidate shall deposit it in duplicate with the University Editor *not later than a date which will be set by the Graduate School for each Quarter* and must pay to the Editor a fee covering the cost of binding the same.

In case the thesis has already been published, the candidate, instead of following the above procedure, may present two printed copies to his adviser, not later than three weeks prior to Commencement Day. The form of printing as well as the contents must be approved by his adviser. If the thesis is so approved the student must deposit these copies with the University Editor *not later than a date which will be set by the Graduate School for each Quarter* and must pay to the Editor a fee covering the cost of binding the same.

The thesis requirement may be waived by the Dean of the Graduate School upon the written recommendation of the candidate's adviser. In all cases where the requirement is waived, action must be taken prior to the date for the filing of the thesis subject.

Abstract of Thesis. In addition to the two approved copies of the thesis which must be deposited with the University Editor, each candidate must

deposit in the office of the Graduate School one approved, typewritten copy of an abstract of the thesis of approximately three hundred words in length. At the close of each Quarter the Graduate Council proceeds immediately to print the abstracts of all the theses submitted during the Quarter, and to bind these together, in sufficient numbers to meet the exchange list of the University Library. Each candidate must deposit with the Bursar of the University not later than *a date which will be set by the Graduate School for each Quarter* the sum of $5.00 *in cash*. This sum will be used by the Graduate Council to defray expenses connected with the editing, the printing, and the binding of the abstracts of theses.

Time Limit on Work for Master's Degree. The entire work for the Master's degree must be completed within a period of six years.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS WITH PHYSICS AND EDUCATION AS FIELDS OF SPECIALIZATION

The following program of study leading to the degree of Master of Arts is arranged for students who have had a good undergraduate training in physics, mathematics, and chemistry, and desire to prepare to teach physics in the secondary schools. Such students must have a high academic standing, good personality and a sincere interest in teaching as a life career.

In addition to obtaining credit for a minimum of thirty Quarter-credit hours in approved graduate courses in physics, mathematics, and chemistry, the following educational requirements must be met: (a) Within the first three Quarters of residence, candidates for this degree must pass a comprehensive examination on the fields covered by Philosophy of Education, Education 501, Principles and Practices of Secondary School Teaching, Education 533-534, General and Educational Psychology, Psychology 401-407, and History of Education, Education 632; (b) Credit must also be secured in the following professional courses: Education 603-604-605, Foundations of Education; Education 701 or 702, Major Course in Secondary Education; Education 684, Teaching of Chemistry and Physics; Psychology 610, Adolescence, or Psychology 628, Principles and Economy of Learning; and Education 536, Supervised Teaching in Secondary Schools, which must be taken in the last Quarter of residence. Credit for this course will be withheld until the degree of Master of Arts is granted.

The program of each student, including the thesis, will be supervised by two advisers, one designated by the Chairman of the Department of Physics and Astronomy and the other by the Executive Committee of the Department of Education. Selection of courses in physics, mathematics, and chemistry will be subject to the approval of these advisers.

GRADUATE COURSE IN SOCIAL ADMINISTRATION

There is apparent need for the social work executive of professional status, indoctrinated in the philosophy of social work, acquainted with its fundamental processes, and keenly appreciative of its objectives and accomplishments. The demonstrated values of specialization should be conserved and enriched by cooperative procedure based on executive grasp of the broad implications of local social work organization, whatever form such community organization may take. The principal object of this course is to prepare men and women for executive positions in Councils of Social Agencies, Playground and Recreation Associations, County Boards of Welfare, Community Chests, Family Service Societies, Municipal Welfare Departments, Probation Departments, Red Cross Organizations, State Boards of Charities, Child Welfare Agencies and other community organizations of charitable and philanthropic activities, both governmental and voluntary.

REQUIREMENTS FOR ADMISSION TO THE GRADUATE COURSE IN SOCIAL ADMINISTRATION

To be admitted to this course students must have had fundamental courses in the social sciences and in psychology. Students whose general education, maturity, and experience justify it, may be admitted to the course, subject to the approval of the instructor, without becoming candidates for the degree and may pursue subjects for which they are qualified.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN SOCIAL ADMINISTRATION

This course for properly qualified students leads to the degree of Master of Arts in Social Administration. To receive this degree, students must be in residence at The Ohio State University for the Autumn, Winter, and Summer Quarters; in addition, the Spring Quarter must be devoted to field work with a social agency approved by the University. In addition to the courses listed in the curriculum given below, candidates for this degree must have at least twenty hourse of credit in the fundamental courses in sociology, psychology, economics, or political science, with not more than half of the work in any one of them. This requirement may be met by courses taken either before or after registration, but without credit toward the degree. Candidates for the degree of Master of Arts in Social Administration must also meet the same requirements in regard to a thesis and final examination as are prescribed for the degrees of Master of Arts and Master of Science.

CURRICULUM IN SOCIAL ADMINISTRATION

Autumn Quarter		Winter Quarter		Spring Quarter	
Social Administration (813) The Community Chest Movement	4	Social Administration (814) Contemporary Social Work	4	Field Work	
Social Administration (950) Research in Social Administration		Social Administration (950) Research in Social Administration		**Summer Quarter**	
Social Administration (845) Methods of Sociological Investigation	4	Social Administration (846) Methods of Sociological Investigation	4	Social Administration (815) Interpretation of Social Work	4
Social Administration (838) Social Case Work	3	Social Administration (670) Community Health Organization	3	Social Administration (950) Research in Social Administration	
Social Administration (835) The Social Worker and Community Groups	3	Social Administration (836) National Social Work Agencies and Local Programs	3	Social Administration (837) Budgeting Community Social Work	3
				Social Administration (671) Community Health Organization	3
				Social Administration (841) Public Welfare Administration	3

Readjustment of the courses outlined above may be arranged with the approval of the Director of the School of Social Administration to meet the needs of individual students. In addition to these courses there are available any "600" or "800" courses in Social Administration, Sociology, or other departments of instruction, subject always to the approval of the appropriate instructor.

GRADUATE COURSE IN PUBLIC ADMINISTRATION

It is the object of this course to prepare students for a career in the public service, particularly in municipal administration and in the foreign service.

REQUIREMENTS FOR ADMISSION TO THE GRADUATE COURSE IN PUBLIC ADMINISTRATION

To be admitted to this course, students must have completed the curriculum in Public Administration in the College of Commerce and Administration or its equivalent.

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN PUBLIC ADMINISTRATION

To receive this degree, students must be in residence at The Ohio State University for at least three Quarters and an additional Quarter must be devoted to field work with some governmental or research agency approved by the adviser. A report upon such field work must be filed with the adviser and approved by him. Organizations with which field work may be done include: the State of Ohio, the principal cities of the state, the important counties of Ohio, the Ohio Institute, the Ohio Chamber of Commerce, and numerous other organizations of local or state-wide scope. Candidates for the degree of Master of Science in Public Administration must also meet the same requirements in regard to a thesis and final examination as are prescribed for the degrees of Master of Arts and Master of Science.

CURRICULUM IN PUBLIC ADMINISTRATION

GENERAL REQUIRED COURSES

Political Science (950) Research in Political Science	Political Science (950) Research in Political Science	Political Science (950) Research in Political Science

MUNICIPAL ADMINISTRATION (OPTIONAL)

Social Administration (813) 4 The Community Chest Movement	Social Administration (670) 3 Community Health Organization	Social Administration (668) 3 Community Organization
Accounting (603) 5 Cost Accounting	Accounting (604) 5 Cost Accounting	*Social Administration (671) 3 Community Health Organization
Political Science (809) 3-5 Municipal Government	Political Science (807) 3-5 Public Opinion and Political Parties	Political Science (808) 3-5 Public Administration
	Geography (634) 3 Urban Centers	

FOREIGN SERVICE (OPTIONAL)

Political Science (611) 5 Jurisprudence	History (630) 3 Diplomacy of Europe	History (629) 3 Modern Germany
Political Science (806) 3-5 Comparative Government	Geography (624) 3 Latin America	History (628) 3 Reconstruction of Europe
	Political Science (810) 3-5 International Relations	Geography (625) 3 Geography of Asia

* Not given in 1936-1937.

DEGREE OF MASTER OF BUSINESS ADMINISTRATION

GENERAL REQUIREMENTS

This course leads to the degree of Master of Business Administration. To receive this degree students must comply with all the regular requirements laid down for the degrees, Master of Arts and Master of Science (see pages 27-32). In addition to these requirements each candidate must meet the following general requirements.

Prerequisites. Before a student may become a candidate for the degree of Master of Business Administration he must have credit for the following subjects: Principles of Economics, Principles of Accounting, Principles of Geography, the equivalent of six Quarter-hours in Business Law, introductory courses in Corporation Finance, Industrial Management, Marketing, Economic Statistics, Money and Banking. (Credit for the specific courses noted may be secured during either the undergraduate or the graduate years.)

In addition to these general prerequisites, the department in which the candidate elects to specialize will have the following prerequisites:

The Department of Accounting: credit for additional courses in Business Law, three hours; Public Finance, six hours; Accounting, thirty-five hours.

The Department of Business Organization: approved courses in either Transportation or Public Utilities for a student wishing to specialize in any one of the fields in Business Organization.

The Department of Geography: at least eighteen Quarter hours in courses in Geography, including economic geography, the United States, and another regional course, if the student expects to specialize in one of the fields represented by that department.

A thesis will be required of all candidates for this degree and the credit granted for the thesis shall not exceed six Quarter-hours.

The credit granted for work in the field of specialization shall be not less than twelve nor more than twenty Quarter hours.

The candidate shall take work in at least three fields other than his field of specialization.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Scholastic Requirements. The general requirements for the degree of Doctor of Philosophy are: (1) A reasonable mastery of the field of specialization chosen, tested by a general comprehensive examination given approximately one year previous to the date on which the candidate expects to come up for the degree; (2) a reading knowledge of two foreign languages (usually French and German); (3) the presentation of an acceptable dissertation embodying the results of an original investigation; and (4) the passing of a final examination upon the dissertation and the immediate field in which the investigation lies.

Residence Requirement. While it is not intended that the degree shall be given as a certificate of faithful and industrious work for a specified length of time, yet it is not believed that the scholastic requirements as given above can be secured by less than the equivalent of three years work devoted wholly to graduate study and investigation with suitable facilities and under proper supervision. Of these years, at least one, and that except by permission of the Graduate Council, the last, must be spent in residence at this University. In case any part of the work is done elsewhere than in this University, such work shall be subject to the approval of the Graduate Council.

A candidate for the degree of Doctor of Philosophy must be registered in the Graduate School during the Quarter in which he expects to receive the degree, unless excused in advance by the Graduate Council from such registration.

Course of Study. The course of study to be pursued for the Doctor's degree will be arranged with each student by his adviser, but the choice of work must be approved as a whole by the Dean of the Graduate School. Work in other departments will be advised according to the needs of the individual student. In all cases the aim will be a reasonable concentration and a reasonable breadth of study, designed to foster both a knowledge of the specialty in relation to allied branches of learning and the power of productive scholarship.

Language Requirement. A reading knowledge is required in at least two foreign languages in which there is a substantial body of scholarly literature bearing upon the student's field of specialization. By a reading knowledge is meant a knowledge sufficient to enable the student to use the languages for the purposes of research. Under this general provision it is within the province of each department to define more specifically its language requirement, subject to the approval of the Graduate Council, by specifying one or both of the two required languages and by designating, generally or specifically, more than two foreign languages to be required of the student.

Before a student will be permitted to take his general examination, he must pass an examination in the languages required. The examination is conducted by the language department concerned. The subject matter of the examination shall be drawn from the literature of the student's field of specialization. Blanks for reporting the results of the examination may be obtained at the office of the Graduate School.

General Examination and Admission to Candidacy. Not later than the middle of the second Quarter prior to the Quarter in which he expects to come up for his degree, a student working for the degree of Doctor of Philosophy is required to pass a general comprehensive examination on the fundamentals of the entire field in which he has elected to specialize without limitation to the courses which the student has pursued. For example, a student who expects to come up for the degree at the end of the Spring Quarter must pass this general examination not later than the middle of the Autumn Quarter. He must be registered during the Quarter in which he expects to take the general examination unless excused by the Dean of the Graduate School. This examination must be a written one to be followed by an oral examination. The satisfactory passing of this examination carries with it admission to candidacy for the degree. After admission to candidacy the candidate must be registered in the Graduate School for at least two Quarters although he will be given complete freedom from all course requirements and will be registered for dissertation only. However, he will be permitted to audit any courses he may choose. No student will be permitted to take the general examination until after he has passed the language examinations.

The general examination is conducted by a committee appointed by the Dean of the Graduate School, after consultation with the student's adviser. This committee shall consist of the student's adviser (who acts as chairman), and such other examiners as the Dean may designate, including at least one who is not a member of the department directly concerned. When the adviser decides that the student is ready for the general examination, he will so notify the office of the Graduate School, in writing, at the same time suggesting the personnel of the examining committee, for the approval of the Dean. After the committee has been approved by the Dean, appropriate blanks for reporting the results of the examination will be sent to the adviser. The selection of a time and place for the examination will be entirely in the hands of the adviser, but he is expected to consult with the various members of the committee before fixing a time for the examination. At the close of the examination the committee shall certify to the Graduate School, on the blank furnished the committee, whether or not the student has passed the examination. In order to be considered satisfactory, the report of the examining committee must be unanimous. However, when there is but a *single* dissenting vote the case is automatically referred to the Executive Committee with power to act.

Dissertation. A dissertation which is a definite contribution to knowledge of importance sufficient to warrant its publication shall be offered by the candidate. *A copy of the dissertation bearing the written approval of the candidate's adviser must be presented to the Dean not less than four weeks previous to the end of the Quarter in which the degree is sought.*

The Dean, after consultation with the candidate's adviser shall then appoint a Committee to consider the merit of the dissertation. The dissertation, together with the report of this Committee, shall be laid before the Council, who will then vote upon the question of its acceptance. In order to be considered satisfactory the report of the committee must be unanimous.

Each candidate must deposit in the office of the Graduate School, not later than a date which will be set by the Graduate School for each Quarter, two *approved* printed or typewritten copies of the complete dissertation, complying in form with specifications obtainable in the Graduate School office. Along

with the copies of the dissertation, the candidate must also deposit a sum sufficient to cover the cost of binding the same ($2.50).

The Final Examination. The final examination is held after the approval of the dissertation. It shall be conducted by a committee consisting of the candidate's adviser (who shall act as chairman) and such other examiners as the Dean of the Graduate School shall designate, after consultation with the candidate's adviser, and shall include at least one person who is not a member of the department directly concerned. The time and place of the examination shall be set by the Chairman of the Examining Committee after consultation with the other members of the committee and the office of the Graduate School shall be promptly notified. The examination shall be oral and shall deal intensively with the portion of the candidate's field of specialization in which his dissertation falls, though it need not be confined exclusively to the subject matter of the dissertation. A written examination also may be required at the discretion of the department concerned. In order to be considered satisfactory the report of the examining committee must be unanimous. However, when there is but a *single* dissenting vote, the case is automatically referred to the Executive Committee of the Graduate Council with power to act.

Abstract of Dissertation. Each candidate must also deposit in the office of the Graduate School, not later than a date which will be set by the Graduate School for each Quarter, one *approved* typewritten copy of an abstract of the dissertation, approximately three thousand words in length. He must also deposit with the Bursar of the University, not later than a date which will be set by the Graduate School for each Quarter, the sum of $50.00 *in cash*. This sum will be used by the Graduate Council to defray the expenses connected with the editing, printing, and binding of the abstracts of dissertations.

GRADUATE WORK IN EDUCATION

A student who undertakes to do graduate work in Education is subject to the rules of the Executive Committee of the Department of Education as well as the rules of the Graduate School. The Executive Committee of the Department of Education is charged with advisory and examining functions with reference to all graduate students in Education.

The method of procedure of registration for students majoring in Education is the same as that outlined on page 23, except that upon receipt of the course of study card from the office of the Graduate School, the student will report immediately to the Executive Committee of the Department of Education, Room 115, Education Building. Under the guidance of this committee the student's adviser is selected and he will assist the student in mapping out a suitable course of study for the degree sought. Further procedure is the same as that outlined on page 23.

In the case of candidates for the Ph.D. degree with a major in education, the adviser is appointed for temporary service only; a permanent advisory committee, nominated by the student and appointed by the Dean of the College of Education, will be substituted for the single adviser upon the initiative of the student, as soon as possible after the student has declared his intention of undertaking work for the Doctor's degree in Education. This advisory committee will be responsible for the guidance of the student and will determine, in consultation with the student, the principal areas of his work. Its members will ordinarily serve upon the larger examining committees appointed by the Graduate School to conduct the general examination and the examination upon the dissertation.

COMMENCEMENT—CONVOCATION

A special Convocation or Commencement is held at the close of each Quarter for the conferring of degrees upon candidates who have fulfilled all the requirements of their respective courses.

ATTENDANCE AT CONVOCATION EXERCISES

All candidates for degrees are required to be present at their graduation convocation unless excused by the President.

RESEARCH INSTITUTES

The following institutes have been organized for furthering research in various fields in order to afford the facilities for carrying on research work whose confines are not limited to a single department:

(a) **The Plant Institute.** This institute affords the facilities of the Departments of Botany, Horticulture, Agricultural Chemistry and Agronomy.

(b) **The Animal Institute.** This institute is organized for the purpose of investigating problems lying in two or more of the following departments: Agricultural Chemistry, Anatomy, Animal Husbandry, Bacteriology, Physiology, Poultry Husbandry, Veterinary Medicine, and Zoology and Entomology.

(c) **The Social Science Institute.** This institute deals with problems which lie in two or more of the following departments: Business Organization, Business Research, Economics, Education, Educational Research, Geography, History, Law, Philosophy, Political Science, Psychology, Rural Economics, Social Administration, and Sociology.

UNIVERSITY ORGANIZATIONS

There are a number of organizations in the University of especial interest to the graduate students. The Gamma Alpha Fraternity, a graduate scientific society, has its own house at which a number of the members of the society live and a still larger number board. There is also a Junior Open Court composed of not more than two representative members of each of the various departments; likewise the Graduate Club in social educational sciences, and the Graduate Women's Club.

The main object of all of these clubs is to bring members together for social purposes and for the discussion of the various problems in which the individual members are interested.

There are also chapters of the national honorary societies, Phi Beta Kappa and Sigma Xi, as well as a number of honorary fraternities. In addition to these, nearly every department offering graduate work has its own graduate club.

UNIVERSITY LECTURES

Each year a number of lectures of special interest to graduate students are given by distinguished scholars from various educational institutions. Some of these lectures are of interest primarily to those in certain fields of work while others are of a general character and of interest to graduate students in general, no matter what their fields of activity may be.

DEPARTMENTS OF INSTRUCTION

The general prerequisites for courses open to graduate students with credit toward a degree are given below. In some departments more detailed prerequisites are required, and in all such cases a statement of these will be found in the description of the courses listed in the departments.

General prerequisites for courses numbered from 600 to 799:

At least junior standing and prerequisites that amount to 20 Quarter hours in the same and allied subjects of which a minimum of at least 10 Quarter hours must be in the same subject; or 30 Quarter hours in not more than two allied subjects.

Special prerequisites as stated in the description of courses must be included within these requirements.

Certain 600 courses in the field of education require as a prerequisite graduate standing in the field of education. These courses are appropriately designated in the list given under the general heading of "EDUCATION."

General prerequisites for courses numbered 800 or above:

These courses are open only to students registered in the Graduate School and have prerequisites that amount to 30 Quarter hours in the same and allied subjects, of which a minimum of 15 Quarter hours must be in the same subject.

COURSES OF GENERAL INTEREST

The courses listed below are of such a character as to be of general interest to all graduate students irrespective of their fields of specialization. Experience has shown that the great majority of those students who are candidates for the degree of Doctor of Philosophy hope to become members of the instructional staffs of colleges. All such students should select the last course listed below, viz., Education 711.

Survey Course 605. Foundations of Contemporary Civilization.

Survey Course 608. Development of Modern Science.

Survey Course 664. Student Economic Problems and the Adviser.

Survey Course 665. Principles of Psychology for Advisers.

(For a full description of these courses see page 194 of this Bulletin, under the heading "Survey Courses.")

Philosophy 652. Philosophy of Science.

(For a detailed description of this course see page 152 of this bulletin.)

ACCOUNTING

Office, 309 Commerce Building

PROFESSORS TAYLOR AND MILLER, ASSOCIATE PROFESSORS HECKERT AND DICKERSON, ASSISTANT PROFESSORS WILLCOX AND SHONTING, MR. BOLON, MR. WALL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," see page 36.

602. Advanced Principles of Accounting. Five credit hours. One Quarter. Autumn, Winter, Spring. Five class meetings each week. Mr. Taylor, Mr. Miller.

The accounting procedure in connection with corporate reorganization and dissolution. Consolidated balance sheets and income statements, branch house accounting, foreign exchange accounting.

603-604. Cost Accounting. Five credit hours. Two Quarters. 603, Autumn and Winter; 604, Winter and Spring. 603, four class meetings and one two-hour laboratory period each week. 604, five class meetings each week. Not open to students who are taking Accounting 624. Mr. Heckert, Mr. Willcox.

The application of material, labor and burden costs to the product under the order and process plans. The use of standards and other methods of control in production and distribution accounting.

607-608. Auditing. Two credit hours. Two Quarters. 607, Autumn Quarter, 608, Winter Quarter. General prerequisites must include Accounting 602 and 604. Mr. Wall, Mr. Taylor, Mr. Miller.

The various kinds of audits and their respective uses. Methods followed in verifying balance sheets and profit and loss accounts. Audit reports and certificates. Duties and responsibilities of an auditor.

***610. Cost Accounting Systems.** Three credit hours. Winter Quarter. General prerequisites must include Accounting 604 or 624.

A study of cost accounting systems of various types, including practice in designing forms and procedure for representative industries. Attention is given to uniform cost systems adopted by various trades.

611. Income Tax Accounting. Two credit hours. One Quarter. Autumn and Spring. Two class meetings each week. Mr. Miller, Mr. Wall.

The accounting principles and procedure involved in the Federal taxes on income and profits. Practice in preparing income tax returns from the accounts of individuals, partnerships, and corporations.

612. Constructive Accounting. Four credit hours. Spring Quarter. Four class meetings each week. General prerequisites must include Accounting 603-604. Mr. Heckert, Mr. Willcox.

Practice in designing accounting systems for typical business enterprises.

613-614. Accounting Practice. Four credit hours. Two Quarters. 613, Autumn Quarter; 614, Winter Quarter. Four class meetings each week. General prerequisites must include Accounting 602, 604, 611, and 616. Mr. Taylor, Mr. Miller.

Practice in the solution of typical accounting problems. The class material is taken largely from the Certified Public Accountants' examinations of the various states.

616. Business Statements. Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. Mr. Bolon.

A study of the different kinds of statements prepared by corporations for the guidance of executives, directors, stockholders, and creditors. The methods used in preparing the necessary statements together with the principles of statement interpretation. Use is made of current statements of well-known corporations. Lectures and problems.

* Not given in 1936-1937.

617. Managerial Accounting. Five credit hours. Spring Quarter. General prerequisites must include Accounting 602 and 604. Mr. Heckert.

The organization and function of the controller's department. The use of accounting and statistical data in the protection, control, planning, and coordination of business. Standards and budgetary procedure.

***621. Fiduciary Accounting.** Two credit hours. Winter Quarter. General prerequisites must include Economics 631-632. It is strongly urged that Economics 633 be taken previously or concurrently.

The principles underlying the accounting problems encountered in the administration of trust estates. Special attention is devoted to the accounting aspects of the Federal Income Tax Law, the Federal Estate Tax, and the Ohio Inheritance Tax.

622. Advanced Accounting Theory. Three credit hours. Spring Quarter. General prerequisites must include Accounting 602. Mr. Taylor.

An examination of some of the prevailing theories of accounting. Recent theories in connection with the valuation of assets; the determination of income and surplus. Each student is required to make a report covering the investigation of some particular subject.

624. Factory Costs. Five credit hours. Spring Quarter. Five class meetings each week. Not open to students taking Accounting 603-604. Mr. Willcox.

The course is intended primarily for students whose major interest is in fields other than Accounting. Emphasis is placed upon the accumulation of material, labor, and expense, cost of production and distribution and to the relationship between cost accounting work and that of other business departments.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

804. Seminary in Accounting. Two credit hours. Autumn Quarter.

950. Research in Accounting. Autumn, Winter, and Spring Quarters.

ADULT EDUCATION

(See Bureau of Special and Adult Education)

AGRICULTURAL CHEMISTRY

Office, 211 Townshend Hall

PROFESSOR LYMAN, ASSOCIATE PROFESSORS ALMY AND BURRELL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. General Biological Chemistry. Five credit hours. One Quarter. Autumn and Winter. Three lectures and two three-hour laboratory periods each week. General prerequisites must include five hours of biological science and acceptable courses in organic and analytical chemistry. Mr. Burrell.

A study of the chemistry of the fats, carbohydrates, proteins, and other compounds of biological importance, and the general chemistry of the metabolism of plants and animals. This course is intended for students majoring in biological subjects, and as a prerequisite to certain advanced courses in this department.

602. Food Inspection and Analysis. Five credit hours. Spring Quarter. One lecture and four three-hour laboratory periods each week. General prerequisites must include a course in pharmaceutical analysis. Mr. Almy.

Lectures and laboratory work on the composition, official methods of analysis, and methods of detection of adulteration of such foods as maple syrup, honey, cocoa, chocolate, spices, vinegar, flavoring extracts, and alcoholic foods.

604. Dairy Chemistry. Five credit hours. Autumn Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include a course in qualitative analysis. Mr. Almy.

The constituents of milk are studied, using lectures, textbooks, and assigned readings. Laboratory work includes the separation and study of the constituents of milk.

* Not given in 1936-1937.

605. Dairy Chemistry. Five credit hours. Winter Quarter. Three lectures and two three-hour laboratory periods each week. General prerequisites must include a course in qualitative analysis. It is recommended that Agricul- requisites must include a course in qualitative analysis. Mr. Almy.

A continuation of Agricultural Chemistry 604. A study is made of the application of some physico-chemical principles in the field of Dairy Technology.

606. Advanced Dairy Chemistry. Five credit hours. Spring Quarter. One lecture and four three-hour laboratory periods each week. General prerequisites must include a course in qualitative analysis. Mr. Almy.

Laboratory and lectures on the analysis of dairy products, milk, condensed milk, dried milk, and butter. This course is designed to teach the methods of analysis used in the chemical control of manufacturing plants and the legal control of dairy products.

***607. Chemistry of Nutrition.** Five credit hours. Spring Quarter. Two lectures and three three-hour laboratory periods each week. Given in alternate years. General prerequisites must include acceptable courses in physiology. Mr. Lyman.

Lectures on the chemistry of nutrition. Laboratory work includes experiments on digestion and utilization of food, determination of fuel value of food and the heat production of man under various conditions, the analysis of blood for waste products of metabolism, the effects on small animals of diets consisting of purified food constituents, and the effects of selected diets on the formation of waste products in the body.

608. Animal Nutrition. Five credit hours. Spring Quarter. Two lectures and three three-hour laboratory periods each week. Given in alternate years. General prerequisites must include Agricultural Chemistry 601 and acceptable courses in physiology. Mr. Lyman.

Lectures on the chemical problems involved in growth, maintenance and fattening of animals, and in the production of milk and work. The composition of feeds and farm rations is discussed from the standpoint of the more recent conception of animal nutrition. Laboratory work includes the determination of coefficients of digestibility, the determination of protein and mineral storage during growth, a study of the energy requirement, and the effect of selected rations on animals.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring. General prerequisites must include Agricultural Chemistry 601. The consent of the instructor is required. All instructors.

Students electing this course must have had at least two five-hour courses in the department. Consent of the department must be secured.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

801. Plant Chemistry. Five credit hours. Spring Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include Agricultural Chemistry 601 and Botany 605. Mr. Burrell.

Lectures, laboratory, and collateral reading on special phases of the chemistry of plant metabolism.

804. Seminary. One credit hour. Autumn, Winter, and Spring Quarters. Required of all graduate students majoring in agricultural chemistry. General prerequisites must include Agricultural Chemistry 601. Mr. Lyman.

950. Research in Agricultural Chemistry. Autumn, Winter, and Spring Quarters. Laboratory, library, and conference work. General prerequisites must include Agricultural Chemistry 701. The consent of the instructor is required. Mr. Lyman, Mr. Burrell, Mr. Almy.

Research may be done in nutrition, plant chemistry, food analysis, or dairy chemistry.

* Not given in 1936-1937.

AGRICULTURAL EDUCATION
Office, 323 Campbell Hall

PROFESSOR STEWART, ASSISTANT PROFESSOR KENESTRICK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Special Methods of Teaching Vocational Agriculture in Secondary Schools. Five credit hours. One Quarter. Autumn, Winter, Spring. Three two-hour recitations each week. Mr. Stewart, Mr. Kenestrick.

An intensive application of the information and practices given in the preceding departmental courses to the preparation of material for specific agricultural courses. The organization of subject matter for effective presentation in the classroom, the planning of lessons, laboratory work, and field trips, the methods of teaching through project supervision, and the organization of part-time courses.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter. Autumn, Winter, Spring.

This course is intended for graduates who wish to work out problems in Agricultural Education including Agricultural Extension and Vocational Education in Agriculture.

†705. Supervised Practice Program Building. Three credit hours. Three discussion periods each week. In addition to the general prerequisites, teaching experience in vocational agriculture or permission of the instructor is required. Students expecting to enroll in this course should communicate with the instructor at least two weeks prior to the beginning of the Quarter in order to arrange for the collection of data on specific problems. Mr. Kenestrick.

A study based upon researches in project accounting and analysis promoted in Ohio in recent years. Conditions in the field are studied from the assembled material and the findings derived from it. A program of improvement is determined.

Not open to students who have credit for Agricultural Education 605.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Special problems are designed particularly for the training of supervisors of agricultural education and trainers of teachers of vocational agriculture.

803. The Problem Method Applied to Secondary and College Teaching in Agriculture. Five credit hours. Spring Quarter. Five discussion periods each week. General prerequisites must include Agricultural Education 601. Other students may enroll by securing permission of the instructor. Mr. Stewart.

An inquiry into the conditions that promote effective teaching with a determination of procedures that contribute to this end. The possibilities of the problem method in agricultural education are fully explored.

804. State Administration and Supervision of Vocational Agriculture. Three credit hours. Spring Quarter. Three discussion periods each week. Mr. Stewart.

A course devoted to a consideration of the following: federal and state legislation relating to vocational agriculture; state plans; records and reports; standards and objectives; teacher training in service; supervisory procedures; state courses of study; placement and recommendations of teachers; promotion of state program; day, evening, and part-time school organizations; and other problems relating to the state administration and supervision of vocational agriculture.

†806. Organization and Administration of Teacher Training for Vocational Agriculture. Three credit hours. Five lectures each week.

A course devoted to a consideration of the following: state plans for resident teacher training; working relations between teacher training departments and state supervisory organization; teacher training courses offered; analysis of the content of teacher training courses; provisions for observation and practice teaching; research in agricultural education; teacher placement and follow-up program.

† Not given during the academic year, 1936-1937.

†807. **Tests and Measurements Adapted to Instruction in Vocational Agriculture.** Three credit hours.

The course is concerned with the development of specific instructional objectives, the analysis of these objectives into expected outcomes, and the formulation of measuring devices to evaluate the outcomes.

†808. **Organization and Methods of Conducting Part-Time and Evening Schools in Vocational Agriculture.** Three credit hours. Winter Quarter. Three discussion periods each week. In addition to the general prerequisites, teaching experience in vocational agriculture or permission of the instructor required. Students expecting to enroll in this course should communicate with the instructor at least two weeks prior to the beginning of the Quarter in order to arrange for the collection of data on specific problems. Mr. Kenestrick.

A course devoted to an analysis of the problems related to part-time and evening schools in vocational agriculture and to the development of objectives and procedures in the organization and conduct of such instruction.

†809. **Research for Teachers of Vocational Agriculture.** Three credit hours. Mr. Stewart.

A course devoted to a study of research techniques and procedures appropriate to studies and researches in the field of agricultural education. The course will direct students to a study of procedures in the promotion of research with individual projects in planning, organizing, and projecting appropriate studies.

810. **Seminary in Agricultural Education.** One to three credit hours. Autumn, Winter, and Spring Quarters. All instructors.

A study of current problems in agricultural education. Provision for investigation, reports and discussion.

AGRICULTURAL ENGINEERING
Office, 105 Ives Hall

PROFESSORS McCUEN, REED, MILLER, AND OVERHOLT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 86.

The general prerequisites include fundamental courses in agricultural engineering, agronomy, mathematics, and physics.

*602. **Advanced Farm Structures.** Five credit hours. Autumn Quarter. Given in alternate years. Three recitations and two three-hour laboratory periods each week. General prerequisites should include courses in animal husbandry. Mr. Miller.

Advanced study of farm building programs, coordinating engineering, biological economics and social factors. The general design and details of construction for units and entire farmsteads.

*603. **Advanced Farm Power Equipment.** Five credit hours. Autumn Quarter. Given in alternate years. Three recitations and two three-hour laboratory periods each week. Mr. McCuen.

Trends in design and application of modern farm power equipment. The farm tractor and its complement of power equipment, such as combines, threshers, feed mills, corn harvesters, will be used as a basis in a study leading toward power programs for economical production.

*604. **Advanced Drainage and Irrigation.** Five credit hours. Autumn Quarter. Given in alternate years. Three recitations and four hours laboratory each week. Mr. Overholt.

Advanced study of conservation of soil by agricultural engineering structures to control erosion, and of soil water regulation through drainage and irrigation systems. A coordination of the biological, engineering, and economic factors involved in individual systems; also, cooperation problems in state and community programs for economic land utilization.

† Not given during the academic year, 1936-1937.
* Not given in 1936-1937.

*605. Advanced Field Machinery. Five credit hours. Spring Quarter. Given in alternate years. Three recitations and two three-hour laboratory periods each week. Mr. Reed.

An advanced study of soil working and crop processing units, coordinating biological, engineering, and economic factors. Trend problems starting with present agronomic, engineering, and management concepts regarding use, design, and needs, and progressing toward the solution of major machinery problems in advanced agricultural practices and systems.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring. All instructors.

Students selecting this course must have had at least two five-hour courses in the department, one of which must have been in line with the problem chosen. Consent of the department must be secured.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Agricultural Engineering. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. Permission of the department required. Mr. McCuen, Mr. Reed, Mr. Miller.

AGRICULTURAL EXTENSION

Office, 115 Townshend Hall

MR. RAMSOWER, DIRECTOR; MR. SPOHN, DISTRICT SUPERVISOR

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

600. Extension Education. Five credit hours. Spring Quarter. Five recitations each week. Given in alternate years. Mr. Spohn.

The application of psychology and principles of education to the program and methods used in extension work.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter. Autumn, Winter, Spring.

This course is intended for graduates who wish to work out problems in Agricultural Education including Agricultural Extension and Vocational Education in Agriculture.

AGRONOMY

Offices, 203 Townshend Hall and 101 Horticulture Building

PROFESSORS R. M. SALTER, PARK, BRADFIELD, AND WILLARD, ASSOCIATE PROFESSORS CONREY AND LEWIS, ASSISTANT PROFESSORS McCLURE, BATCHELOR, AND F. J. SALTER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

The general prerequisites should include also fundamental courses in agronomy, agricultural chemistry, and biological science.

601. Soil Fertility. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include elementary courses in agricultural chemistry, biological science, and soils. Mr. R. M. Salter.

A study of soil fertility practices in the production of both general and specialized crops. Consideration is given to recent developments in fertilizer manufacture, and in the usage of fertilizers, liming materials, green manures, etc. Both theoretical and practical aspects are emphasized.

Not open to students who have credit for Soils 601.

* Not given in 1936-1937.

602. Chemical Methods Used in Soils Investigations. Five credit hours. Autumn Quarter. Two lectures and nine laboratory hours each week. Given in alternate years. General prerequisites must include elementary courses in agricultural chemistry, biological science, and soils. Mr. McClure.

The fundamentals of inorganic quantitative analysis as applied to soils, fertilizers, and liming materials.

Not open to students who have credit for Soils 602.

603. Origin and Classification of Soils. Five credit hours. Spring Quarter. Four lectures and one three-hour laboratory period each week. Mr. Conrey.

The characteristics of soils as developed under various climatic conditions and their application in soil classification with special reference to Ohio conditions. Laboratory study of soil characteristics, field trips to several of the important soil areas in Ohio.

Not open to students who have credit for Soils 603.

604. Soil Erosion and Its Control. Five credit hours. Spring Quarter. Four lectures and one three-hour laboratory period each week. General prerequisites must include Agricultural Chemistry 401, ten hours of biological science, and Agronomy 501. Mr. Conrey.

A study of the nature, causes, occurrences and economic importance of soil erosion, and of the methods and agencies for its control. Field trips for study of erosion in different regions of the state with visits to erosion experiment station and demonstration control areas.

607. Field Crop Breeding. Five credit hours. Spring Quarter. Four two-hour lecture-laboratory periods each week. Given in alternate years. General prerequisites must include Agricultural Chemistry 401, five hours of Botany, Zoology 403, and five hours of Agronomy. Mr. Park.

Application of genetics to the improvement of field crops. Study of the techniques involved in hybridization, selection of desired characteristics and testing the progenies. Problems in commercial production of hybrid seed corn, and of certified and registered seeds of all types of field crops.

608. Soil Physics. Five credit hours. Winter Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include elementary courses in agricultural chemistry, biological science, soils, and a course in physics. Mr. Bradfield, Mr. McClure.

A study of the structure and physical properties of soils, including size distribution of particles, plasticity constants, soil-water, soil-air and temperature relationships. Special emphasis is placed on the behavior of soils under field conditions and upon the soil as a physical medium for plant growth.

Not open to students who have credit for Soils 604 or 608.

609. Physical Chemistry of Soils. Five credit hours. Spring Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include Agronomy 608. Mr. Bradfield, Mr. McClure.

A study of the soil as a dynamic physico-chemical system with especial emphasis upon the properties of colloidal clay and organic matter and their role in natural soil development and improvement. The development and correction of soil acidity, base exchange phenomena, reactions of soils with fertilizers, factors affecting the composition of the soil solution and the growth of plants are among the subjects treated.

Not open to students who have credit for Soils 604 or 609.

701. Special Problems. Three to fifteen credit hours. May be taken in units of three or five credit hours for one or more Quarters. Autumn, Winter, Spring. General prerequisites must include ten hours of biological science and ten hours of agronomy. The consent of the instructor is required. All instructors.

Problems involving library, laboratory or field study in plant breeding, weed control, field experimentation, special crops or special soils problems may be selected.

702. Agronomy Seminary. One to five credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include ten hours of biological science and ten hours of agronomy. The consent of the instructor is required.

Topics for 1936-1937:

Autumn Quarter: Soil Structure. Mr. Bradfield.

Winter Quarter: Recent Pasture Research. Mr. R. M. Salter, Mr. Willard.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Agronomy. Autumn, Winter, and Spring Quarters.

Research work in plant breeding and crop production under the direction of Mr. Park, Mr. Willard, and Mr. Lewis; research work along physical, chemical, or biological lines as related to soils under the direction of Mr. R. M. Salter, Mr. Bradfield, Mr. Conrey, Mr. Batchelor, and Mr. McClure.

AMERICAN HISTORY
(See History)

ANATOMY
Office, 410 Hamilton Hall

PROFESSORS BAKER AND KNOUFF, ASSOCIATE PROFESSOR EDWARDS, ASSISTANT PROFESSORS SETTERFIELD, PALMER, AND YATES, MR. GRAVES

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Courses 621-628 inclusive are open only to students doubly registered in the College of Medicine and the Graduate School; courses 628, 638, 639, and 640 are open only to students doubly registered in the College of Dentistry and the Graduate School to the extent of 15 Quarter hours.

601-602-603. Seminary. One credit hour. Autumn, Winter, and Spring Quarters. One conference each week. General prerequisites must include two Quarters of anatomy. Required of all graduate students taking a major in anatomy. The staff.

Lectures by members of the staff, conferences on investigations being carried on in the department, and reports on recent investigations in anatomy. Subjects for extended study will be changed from Quarter to Quarter.

604. Anatomical Methods. Three or five credit hours. One Quarter. Autumn, Winter, Spring. One conference and the equivalent of four or eight laboratory or study hours each week. The staff.

This course is designed for and limited to Anatomy majors desiring to begin investigative work.

A study of the various techniques employed in anatomical research. Permission of the director must be secured.

611. Comparative Histology. Five credit hours. Autumn Quarter. Three lectures and six laboratory hours each week. General prerequisites must include Anatomy 613, 616, and 619, or Zoology 617, 618, and 620 or equivalent. Mr. Knouff.

The general histology and cytology of the blood, the connective tissues, the vascular, respiratory and excretory systems.

612. Comparative Histology. Five credit hours. Winter Quarter. Three lectures and six laboratory hours each week. General prerequisites must include Anatomy 611 or equivalent. Mr. Knouff.

The general histology and cytology of the organs of digestion, absorption, secretion and reproduction with special emphasis on the cytology of the glands of internal secretion.

613. Comparative Anatomy of the Vertebrates. Five credit hours. One Quarter. Autumn and Winter. Two lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. A course in evolution is recommended. Mr. Setterfield.

The comparative anatomy of the Elasmobranchs and Amphibians as illustrated by the shark, frog, and mud-puppy.

614. Comparative Anatomy of the Vertebrates. Five credit hours. Winter Quarter. Two lectures or recitations and two three-hour laboratory periods

each week. General prerequisites must include Anatomy 613 or equivalent. Mr. Setterfield.

The comparative anatomy of the reptiles and birds as illustrated by the turtle, alligator, snake, and pigeon.

616. **Comparative Vertebrate Embryology.** Five credit hours. One Quarter. Winter and Spring. Two lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include Anatomy 613. Mr. Yates.

The development of the chick with especial emphasis on the formation of foetal membranes and on the development of the organs.

617. **Elementary Neurology.** Five credit hours. Winter Quarter. Two lectures and six laboratory hours each week. General prerequisites must include Anatomy 611 or equivalent. Mr. Setterfield.

The comparative morphology of the nervous system and the histology of the sense organs of the vertebrates.

Not open to students who have credit for Anatomy 408.

618. **Elementary Neurology.** Five credit hours. Spring Quarter. Two lectures and six laboratory hours each week. General prerequisites must include Anatomy 617. Mr. Setterfield.

The study of the microscopic structure of the spinal cord and brain of the higher mammals with special reference to reaction systems.

619. **Comparative Anatomy of the Vertebrates.** Five credit hours. Spring Quarter. Two lectures or recitations and six laboratory hours each week. General prerequisites must include Anatomy 613 or equivalent. Anatomy 616 is recommended. Mr. Setterfield.

The anatomy of the mammals with special reference to the cat.

NOTE: Courses 621 to 641: Open only to students registered in the College of Medicine or in the College of Dentistry.

621-622-623. **Human Anatomy.** Five credit hours. Autumn, Winter, and Spring Quarters. Two lectures or recitations and ten laboratory hours each week. Mr. Baker, Mr. Palmer, Mr. Graves.

The gross anatomy of the thorax and abdomen; of the extremities and perineum; of the head and neck.

624. **Microscopic Anatomy.** Five credit hours. Autumn Quarter. Two recitations, one lecture, and nine laboratory hours each week. Mr. Knouff, Mr. Yates.

The general histology of epithelium, connective tissues, blood and muscle and the special histology of the skeletal, muscular, vascular, integumentary, respiratory, digestive and endocrine systems.

625. **Developmental Anatomy.** Five credit hours. Winter Quarter. Two recitations, one lecture, and nine laboratory hours each week. The lecture hour may be replaced by a seminary hour. Mr. Knouff, Mr. Yates.

The histology of the urinary and reproductive organs and the general embryology of the mammal, with special reference to man.

626. **Neuro-Anatomy.** Five credit hours. Spring Quarter. Two recitations, one lecture, and nine laboratory hours each week. Mr. Knouff, Mr. Graves, Mr. Yates.

The gross anatomy and histology of the central nervous system including sense organs with special reference to the reaction systems and to the anatomical basis of neuro-pathology.

627. **Topographical Anatomy.** Two credit hours. Autumn Quarter. One lecture or recitation and two laboratory hours each week. General prerequisites must include Anatomy 621, 622, and 623. Mr. Baker, Mr. Palmer.

The topographical relations of gross anatomy based on surface and sectioned material.

628. **Special Advanced Anatomy.** Three credit hours. Winter Quarter. One conference or lecture and six laboratory hours each week. General prerequisites must include Anatomy 627 or its equivalent. The consent of the instructor is required. Mr. Baker.

Students will select or have assigned to them special regions for dissection and study.

638-639. Human Anatomy. Seven credit hours. Autumn and Winter Quarters. Two recitations and fifteen laboratory hours each week. Mr. Edwards.

The gross anatomy of the body with special stress on the anatomy of the head and neck, including the osteology of these parts.

640. Histology and Embryology. Five credit hours. Spring Quarter. Three recitations and nine laboratory hours each week. Mr. Knouff.

The general histology of the tissues and the special histology of the skeletal, vascular, digestive, respiratory, urinary and nervous systems, including special embryological features of the teeth and histology of the reproductive system.

641. Sectional Anatomy. One credit hour. Autumn Quarter. Three hours of laboratory including lecture or quiz each week. General prerequisites must include Anatomy 638-639-640. Mr. Edwards.

A detailed study of head sections with special attention to the structures concerned in the procedures of oral surgery.

701. Minor Problems in Anatomy. Three to five credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include the equivalent of a major in Anatomy or allied departments, including Anatomy 604. The staff.

FOR GRADUATES

900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Anatomy. Autumn, Winter, and Spring Quarters. General prerequisites must include the equivalent of a major in Anatomy, including Anatomy 604 and 701. The staff.

ANCIENT HISTORY AND LITERATURE

A program leading to the degree of Master of Arts may be arranged in the combined fields of Ancient History and the Classical Languages. Such a program must be approved by Mr. McDonald of the Department of History, Mr. Titchener of the Department of Classical Languages, and the Dean of the Graduate School.

ANIMAL HUSBANDRY

Office, Animal Husbandry Building

PROFESSORS GAY, KAYS, COFFEY, AND SALISBURY, MR. HEIZER, MR. SUTTON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

All work leading to a graduate degree in this department shall be done under the supervision of a graduate committee which shall consist of the chairman of the department, a member of the staff chosen by the chairman and the student's adviser. This committee shall pass on a candidate's fitness for the work, prescribe his course, and approve his thesis plans before he proceeds.

GENERAL LIVE STOCK PRODUCTION

607. Meats and Meat Products. Three credit hours. Spring Quarter. Three lecture-laboratory periods each week. General prerequisites must include a course in bacteriology. Mr. Gay, Mr. Kunkle.

For students interested in the commercial meats and allied fields. A more advanced study of the composition and nutritive value of meat; meat consumption and the packing industry; wholesale and retail cutting; processing, storage, spoilage, and shrinkage; cutting costs and meat merchandising. Actual experience in meat retailing is afforded students in putting up orders for campus dining halls.

608. Live Stock Marketing. Five credit hours. Winter Quarter. Five lectures each week. Mr. Henning.

The various agencies and organizations involved in the marketing of live stock will be studied. Methods of selling, basis of sale, choice of markets, grade price differentials will be reviewed. The problems of transportation and financing will be considered. Emphasis will be placed on recent developments, concentration, direct to packer marketing, costs of marketing, management, public relations and other problems in live stock marketing.

Not open to students who have credit for Rural Economics 625.

611. Improved Methods of Breeding Live Stock. Three credit hours. Winter Quarter. One two-hour seminary and one conference hour each week. General prerequisites must include a course in heredity. Mr. Heizer.

Offered for advanced students and graduate students wishing to become familiar with the latest methods in the scientific breeding of live stock. The function of the progeny test as a tool for measuring the genetic potentialities of sires and dams is emphasized.

Seminary periods utilized for discussion of recent contributions to the science of animal breeding.

DAIRY PRODUCTION

612. Milk Production. Three credit hours. Winter Quarter. Three two-hour laboratories each week. General prerequisites must include Bacteriology 607. Mr. Sutton.

A course dealing with the problems involved in the production of quality milk; methods of keeping a low bacterial count and the handling of the product to insure proper condition at delivery to the distributor.

614. Dairy Husbandry Investigation. Five credit hours. Autumn Quarter. Three lectures and one four-hour laboratory period each week. Prerequisite, at least twenty hours in Dairy Production courses and permission of instructor in charge. Mr. Salisbury, Mr. Heizer, Mr. Sutton.

A course designed to cover the experimental work being pursued at the leading experiment stations. Experimental procedures of nutrition, milk secretion and reproduction studies.

616. Dairy Inspection Trip. No credit hours. An inspection trip of approximately two weeks, without credit, will be required of all students specializing in Dairy Production, to be taken immediately following the Spring Quarter of the junior year. Mr. Salisbury, Mr. Heizer.

The purpose of this inspection trip is to study at first hand the leading breeding herds, commercial dairies and research programs in operation in the Eastern part of the country.

626. Marketing of Dairy Products. Three credit hours. Winter Quarter. Two lectures each week. General prerequisites must include Rural Economics 613. Mr. McBride.

A study of assembling, transportation and marketing of dairy products, with special reference to Ohio. Attention will be given to changing market areas, producers' cooperative movements and manufacturers' consolidation activities. One or two inspection trips of two or three days will be made.

Not open to students who have credit for Rural Economics 626.

SPECIAL PROBLEMS

GENERAL LIVE STOCK PRODUCTION AND DAIRY PRODUCTION

701. Special Problems. Three to fifteen credit hours. Given in units of three to five hours a Quarter for one or more Quarters. Autumn, Winter, Spring. Mr. Gay, Mr. Plumb, Mr. Kays, Mr. Coffey, Mr. Salisbury, Mr. Heizer, Mr. Sutton.

Special assignments in the advanced phases of any of the lines of animal and dairy production and meats. Students will elect work in desired subjects after conference with the instructor in charge.

NOTE: Students desiring work in animal nutrition, see Agricultural Chemistry 601, 607, 608.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

This will include at least two years' study of the types and breeding of live stock with collateral work in the principles of breeding, feeding and management.

950. Research in Animal Husbandry. Autumn, Winter, and Spring Quarters.

Research work in Animal Husbandry is conducted under the direction of Mr. Gay, Mr. Kays, Mr. Coffey; in Dairy Production under the direction of Mr. Salisbury; in Genetics under the direction of Mr. Heizer; in Nutrition under the direction of Mr. Sutton; and in Meats under the direction of Mr. Gay.

ART

(See Fine Arts)

ASTRONOMY

(See Physics and Astronomy)

BACTERIOLOGY

Office, 210 Pharmacy and Bacteriology Building

PROFESSORS HUDSON, MORREY (EMERITUS), AND STARIN, ASSISTANT PROFESSORS BIRKELAND, MARKHAM, STAHLY, AND WOOLPERT, MR. DEEM, MR. WEISER, AND ASSISTANTS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

The prerequisites for all courses in this group consist of fifteen hours of biological sciences and fifteen hours of chemistry in addition to any other prerequisites stated in the description of the courses.

607. General Bacteriology. Five credit hours. One Quarter. Autumn, Winter, Spring. Two lectures, one recitation, and three two-hour laboratory periods each week. Mr. Stahly, Mr. Birkeland, Mr. Weiser.

This course is a prerequisite to all elective courses in the department and is designed to prepare for special work. The lectures consider the botanical relationships of bacteria, their morphology, classification, effect of physical and chemical environment, action on food material, etc. The laboratory work includes preparation of the ordinary culture media and making of cultures on these media, staining methods, and some typical biochemical actions.

Not open for graduate credit to students majoring in bacteriology.

608. Pathogenic Bacteriology. Three credit hours. Winter Quarter. Three class periods each week. General prerequisites must include Bacteriology 607. Mr. Starin.

A study of some of the important bacteria producing disease in man. Modes of transmission and methods of protection against infectious diseases. Sanitation and the theories of immunity.

609. Pathogenic Bacteriology. Three credit hours. Winter Quarter. Three three-hour laboratory periods each week. General prerequisites must include Bacteriology 607. Mr. Starin, Mr. Stahly, and assistant.

Laboratory work on some of the important bacteria producing disease in man, including cultural and staining properties, methods of diagnosis, animal inoculation.

610. Dairy Bacteriology. Three credit hours. Winter Quarter. Three class periods each week. General prerequisites must include Bacteriology 607. Mr. Weiser.

Sources and kinds of bacteria in milk and in normal milk fermentation. Uses of bacteria in butter making, and of bacteria and fungi in cheese making. Bacteria involved in unnatural milk fermentation and methods of control.

611. Dairy Bacteriology. Three credit hours. Winter Quarter. Three three-hour laboratory periods each week. Bacteriology 607 and 610 must be included in the general prerequisites. However, 610 may be taken concurrently. Mr. Weiser.

Laboratory work on the organisms discussed in Bacteriology 610.

614. Water Examination, Sewage Disposal, Water Filtration. Three credit hours. Winter Quarter. Three class periods each week. General prerequisites must include Bacteriology 607. Mr. Birkeland.

A study of the organisms concerned in these processes. The modern water filtration and sewage disposal plants of the city of Columbus afford most excellent opportunities for practical demonstration and also for study of special problems.

617. Immunity and Serum Therapy. Three credit hours. One Quarter. Autumn and Spring. Three class periods each week. General prerequisites must include Bacteriology 607, 608, and 609, or equivalents. Mr. Starin.

A discussion of the general principles of immunity, including toxins and anti-toxins, bactericidal substances, agglutinins, precipitins, opsonins, etc.

618. Immunity and Serum Therapy. Three credit hours. Autumn Quarter. Three three-hour laboratory periods each week. General prerequisites must include Bacteriology 607, 608, and 609, or equivalents. Mr. Starin.

Laboratory work in the preparation of toxins, anti-toxins, anti-bacterial substances, bacterial vaccines, and in the serological methods of diagnosis.

619. Pathogenic Protozoa. Three credit hours. Spring Quarter. Three class periods each week. General prerequisites must include Bacteriology 607, 608, and 609, or equivalents. Mr. Markham.

The various protozoal diseases are considered, with special attention to trypanosomiases, piroplasmoses, and spirochaetoses.

621. Advanced Dairy Bacteriology. Three credit hours. Spring Quarter. One lecture, one conference, and two two-hour laboratory periods each week. General prerequisites must include Bacteriology 607, 610, and 611, or equivalents. Mr. Stahly.

A continuation of Bacteriology 610, with particular attention to butter culture starters and the practical handling of them in the dairy industry.

A study of the bacteria and fungi involved in the ripening of various types of cheese.

Methods of isolation and identifying bacteria in milk that are responsible for mastitis and contagious abortion.

626. Special Technique in Pathogenic Bacteriology. Five credit hours. Winter Quarter. Conferences, library, and laboratory work. General prerequisites must include Bacteriology 607, 608, and 609, or equivalents. Mr. Starin.

A course in technique in which the student is thoroughly trained in working with such material and methods as are encountered in board of health and hospital laboratories.

627. Special Problems in Pathogenic Bacteriology. Five credit hours. Spring Quarter. Conferences, library, and laboratory work. General prerequisites must include Bacteriology 607, 608, 609, or equivalents. Mr. Starin.

631. Advanced Pathogenic Bacteriology. Three credit hours. Spring Quarter. Three class periods each week. Bacteriology 607, 608, and 609, or the equivalent, must be included in the general prerequisites. Mr. Starin.

A continuation of Bacteriology 608, including a study of those organisms pathogenic for man, not covered in the preceding course. Modes of transmission, methods of protection against infectious diseases, sanitation, and immunological relationships. Lectures, conferences, and reports.

632. Advanced Pathogenic Bacteriology. Three credit hours. Spring Quarter. Three three-hour laboratory periods each week. General prerequisites must include Bacteriology 607, 608, and 609, or the equivalent. Concurrent with Bacteriology 612. Mr. Starin and assistant.

A continuation of Bacteriology 609, including laboratory work in those organisms producing diseases in man, not studied in the previous course. Cultural and staining properties. Methods of diagnosis, pathogenic relationships and immunological characteristics.

635. Physiology of Bacteria. Three credit hours. Autumn Quarter. Three class periods each week. General prerequisites must include Bacteriology 607 and two Quarters of organic chemistry. Mr. Stahly.

Studies of bacterial metabolism including enzymes, mechanisms of biochemical changes and products. Uses of bacteria in fermentation industries. General interrelationships between bacteria and their physical and chemical environment.

Not open to students who have credit for Bacteriology 616.

643-644-645. Applied Veterinary Bacteriology. Two credit hours. Autumn, Winter, and Spring Quarters. Six three-hour laboratory periods each week. General prerequisites must include courses in general and pathogenic bacteriology. Mr. Deem, Mr. Markham.

A course in technic in which the student is given thorough training in diagnostic, preventive, and curative methods on material actually brought into the Veterinary Clinic.

This included during a single year 2500 agglutination tests for contagious abortion, 7000 agglutination tests for white diarrhoea, preparation of autogenous vaccines in selected cases, bacteriological diagnosis of specimens sent in by veterinarians, bacteriological examination of water and milk samples.

649. Filterable Viruses. Three credit hours. Spring Quarter. Three lectures each week. Bacteriology 607, 608, and 609, or equivalent, must be included in the general prerequisites. Mr. Hudson.

Lecture and demonstration course on the nature and action of filterable viruses as ultramicroscopic parasites of man, animals and plants.

701. Minor Investigations. Three or five credit hours each Quarter. Autumn, Winter, Spring. A student may enter at the beginning of any Quarter. General prerequisites must include Bacteriology 607, 608, 609 and either 617, 618, or 626 or equivalents. Department staff.

This course is designed for such students as have completed the equivalent of two years' work in bacteriology and are still undergraduates. The work will be outlined by the instructor in charge to meet the individual student's needs.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Students intending to specialize in bacteriology should take in addition to their major work, courses in botany, pathology, anatomy, physiology, zoology, dairying, or soils, depending upon the field of specialization. The general prerequisites also include an acceptable course in organic chemistry.

807-808-809. Seminary in Bacteriology. One credit hour. Autumn, Winter, and Spring Quarters. Required of all graduate students majoring in bacteriology. Department staff.

950. Research in Bacteriology. Autumn, Winter, and Spring Quarters. General prerequisites must include acceptable courses in the chosen field of research. Department staff.

BOTANY

Office, 102 Botany and Zoology Building

PROFESSORS TRANSEAU, SCHAFFNER (RESEARCH), STOVER, SAMPSON, AND TIFFANY, ASSOCIATE PROFESSORS WALLER AND MEYER, ASSISTANT PROFESSOR BLAYDES, MISS LAMPE, MR. GORDON, MR. FREELAND, MR. DAVIS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Plant Ecology. Five credit hours. Autumn Quarter. Three lectures and one four-hour laboratory period each week. Mr. Transeau, Mr. Gordon.

Lectures on the vegetation of the Eastern United States with special reference to the plant associations and formations of Ohio. Field work on the associations of the vicinity of Columbus and their successions. Reading of important literature. Several Saturday field trips.

602. Plant Ecology. Five credit hours. Spring Quarter. Three lectures and one four-hour laboratory period each week. General prerequisites must include Botany 601. Mr. Transeau, Mr. Gordon.

General principles of ecological plant geography. A discussion of associations and successions of the major divisions of the vegetation of North America. Assigned readings of the more important literature. Several Saturday field trips.

605. Plant Physiology. Five credit hours. One Quarter. Autumn and Winter. Three lectures and two two-hour laboratory periods each week. Mr. Transeau, Mr. Meyer, Mr. Freeland.

The physiology of absorption and movement of water, salts, and gases in plants. The properties of water, solutions, and colloids; permeability, diffusion, absorption, transpiration.

Not open to students who have credit for Botany 415.

606. Plant Physiology. Five credit hours. One Quarter. Winter and Spring. Three lectures and two two-hour laboratory periods each week. General prerequisites must include Botany 605. Mr. Transeau, Mr. Meyer, Mr. Freeland.

The physiology of nutrition, growth and movement; photosynthesis, other syntheses, enzymes, digestion, translocation, accumulation, assimilation, respiration, fermentation, growth.

Not open to students who have credit for Botany 416.

611. Evolution of Plants. Three credit hours. Spring Quarter. Lectures and assigned readings. General prerequisites must include four Quarters of Botany. Mr. Schaffner.

The progress of evolution in the plant kingdom with a general discussion of the problems and factors involved, including both the scientific and philosophical aspects of the subject.

613. General Morphology of Thallophytes and Bryophytes. Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. Mr. Blaydes.

A study of the classification and life histories of the algae, fungi, liverworts, and mosses. The laboratory work will consist of a study of the vegetative and reproductive structures of the several groups.

Not open to students who have credit for Botany 409.

614. General Morphology of the Pteridophytes and Spermatophytes. Five credit hours. Winter Quarter. Two lectures and three two-hour laboratory periods each week. Miss Lampe.

A study of the comparative structures and life histories of the ferns, gymnosperms, and angiosperms, giving particular attention to the structure and development of seed plants.

Not open to students who have credit for Botany 410.

615. Plant Microtechnic. Five credit hours. Winter Quarter. Two lectures and three two-hour laboratory periods each week. Mr. Blaydes.

Principles and methods of killing, fixing, imbedding, sectioning, staining, and mounting plant materials for microscopic study.

Not open to students who have credit for Botany 421.

617. Plant Microchemistry. Five credit hours. Autumn Quarter. One lecture and three two-hour laboratory periods each week. General prerequisites must include Botany 605 and 606. Desirable antecedents, general inorganic and organic chemistry. Mr. Sampson.

The identification *in situ* of organic and inorganic substances found in plant tissues by microchemical methods. These methods are of special value in determining plant substances within the cells and in the study of physical and chemical changes accompanying plant processes and plant responses. This applies particularly to the numerous local regions in plants too small to be attacked by the test-tube method of tissue analysis.

619. Economic Botany. Five credit hours. Autumn Quarter. Four lectures and one two-hour laboratory period each week. Desirable antecedents, commercial geography and plant ecology. Mr. Waller.

The world's food, fibre, and oil producing plants are studied in the light of their geographic distribution. The ecological and economic principles involved in plant production are discussed and centers of production are related to natural plant formations.

***632. Physiological Methods.** Three credit hours. Spring Quarter. Six laboratory hours each week. Botany 605-606 must be included in the general prerequisites or must be taken concurrently, except by special permission of the instructor. Mr. Meyer.

Methods of measuring the physical factors of the environment that influence plant growth and development both under laboratory and field conditions. Methods of growing plants under controlled conditions for experimental work. Conferences, readings, and laboratory work.

633. Physiological Methods. Three credit hours. Winter Quarter. Six laboratory hours each week. Botany 605-606 must be included in the general prerequisites or must be taken concurrently, except by special permission of the instructor. Mr. Meyer.

A laboratory course in the methods of plant physiology such as measurements of H-ion concentration, osmotic values, permeability, enzyme activity and the processes of transpiration, respiration, and photosynthesis. Conferences, readings and laboratory work.

634. Plant Growth. Three credit hours. Spring Quarter. Three lectures each week. Consult instructor before registering. Mr. Sampson.

A study of the physiology of growth. Special attention is given to the interrelated effects of internal and external factors upon growth, movement and reproduction in plants. Bibliographies and reviews of literature.

635. Plant Genetics. Five credit hours. Spring Quarter. Five recitations each week. General prerequisites must include a course in heredity. Mr. Waller.

The study of heredity in plants. Theories of the transmission of heritable characteristics. Research methods in the study of inheritance.

***637. Plant Cytology.** Three credit hours. Spring Quarter. Three two-hour laboratory periods each week. General prerequisites must include four Quarters of biology. Given biennially, alternating with Botany 640. Miss Lampe.

The structure, ontogeny, divisions and fusions of plant cells.

640. Plant Anatomy. Three credit hours. Spring Quarter. Three two-hour laboratory periods each week. Given biennially, alternating with Botany 637. Mr. Blaydes.

The origin and development of the organs, and tissue systems of vascular plants, and comparative study of the structures of roots, stems, leaves, flowers, and fruits. This course is a desirable antecedent to advanced work in physiology and pathology.

653. Mycology. Three credit hours. Autumn Quarter. Three two-hour laboratory periods each week. Mr. Stover.

The identification of the fungi of woods and fields, including a number of edible and poisonous mushrooms, wood-destroying fungi, and other important forms. The characteristic structures and life histories within each of the great groups are emphasized.

656. Advanced Plant Pathology. Three credit hours. Winter Quarter. Three two-hour laboratory periods each week. General prerequisites must include a course in general plant pathology. Mr. Stover.

665. Freshwater Algae. Three credit hours. Winter Quarter. Three two-hour laboratory periods each week. General prerequisites must include six Quarters of biological work. Consent of the instructor is required. Mr. Tiffany.

Conference, laboratory, and library course on the classification, morphology, and ecological relations of the freshwater algae.

701. Special Problems: Taxonomy, Morphology, Physiology, Cytology, and Anatomy. Two to five credit hours each Quarter. Autumn, Winter, Spring. The staff.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 683.

* Not given in 1936-1937.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Students majoring in plant pathology must have acceptable courses in microchemistry, bacteriology and plant genetics, in addition to the undergraduate courses in pathology. Advanced work in plant physiology presupposes at least an elementary course in organic chemistry. With plant physiology, suitable courses may be elected in physical, organic and plant chemistry, and in soil investigations. With plant pathology, various courses in entomology and bacteriology are available.

807. Principles of Taxonomy: Pteridophytes and Gymnosperms. Five credit hours. Autumn Quarter. Two lectures and six laboratory hours each week. Mr. Schaffner.

A detailed study of phylogeny and evolutionary series based on floral structure and organography.

Not open to students who have credit for Botany 607.

808. Principles of Taxonomy: Monocotyls. Five credit hours. Winter Quarter. Two lectures and six laboratory hours each week. General prerequisites must include Botany 807. Mr. Schaffner.

A study of the groups of monocotyls with special consideration of the taxonomy of the grasses and of the lack of correlation between taxonomic characters and environment.

Not open to students who have credit for Botany 608.

809. Principles of Taxonomy: Dicotyls. Five credit hours. Spring Quarter. Two lectures and six laboratory hours each week. General prerequisites must include Botany 808. Mr. Schaffner.

A general consideration of all the groups of dicotyls, of the origin of angiosperms, and of the progressive or serial development of characters.

Not open to students who have credit for Botany 609.

810. Botanical Colloquium. One credit hour. Autumn, Winter, and Spring Quarters. Required of all graduate students majoring in botany. All instructors.

812. Seminary in the History of Botany. One credit hour. Winter Quarter. Recommended for all graduate students majoring in botany. Mr. Waller.

950. Research in Botany. Autumn, Winter, and Spring Quarters.

Research work in taxonomy, morphology, anatomy, cytology, physiology, genetics, plant pathology, or economic botany is offered by various members of the staff. Mr. Transeau, Mr. Schaffner, Mr. Stover, Mr. Sampson, Mr. Tiffany, Mr. Waller, Mr. Meyer, Mr. Blaydes, Miss Lampe, Mr. Gordon, Mr. Davis.

BUREAU OF BUSINESS RESEARCH

Office, 206 Commerce Building

PROFESSORS BELL AND BOOTHE, ASSISTANT PROFESSOR YOCUM, RESEARCH ASSOCIATE CHUTE

The purposes of the Bureau of Business Research are to serve as a laboratory for the faculty and students of the College of Commerce and Administration and at the same time to make cooperative studies in business and industry, which will be useful in the commercial and industrial development of the state.

The studies made and services rendered by the Bureau should be of value to the business concerns cooperating in the studies. They should also be useful to the faculty in the development of illustrative and problem material for the courses offered in the College. In so far as it may be feasible, advanced undergraduate and graduate students will be used to assist staff members in studies which are undertaken. This service will have a value in acquainting students with research problems and methods.

It is expected that staff members of the Bureau will be subject to call in making the results of their studies available to students in the College. It is

also a part of the plan of the College to assign from time to time members of the Bureau Staff to campus teaching or Extension service and likewise to transfer staff members of the Extension or campus teaching departments to research projects in the Bureau.

The files and data collected by the Bureau will also be subject to use by members of the Faculty in connection with their College work.

BUREAU OF EDUCATIONAL RESEARCH

Office, 200, 201 Education Building

PROFESSORS CHARTERS, HOLY, R. TYLER, ANDERSON, COWLEY, AND AIKIN, ASSOCIATE PROFESSOR DALE, ASSISTANT PROFESSORS MacLATCHY AND K. TYLER, MISS SEEGER, MISS KNOWLTON

The purpose of the Bureau of Educational Research is to promote the scientific investigation of educational problems both in the University and in the public schools of the State. It constitutes an agency for cooperative effort among all the school people of Ohio. The facilities of the Bureau are available to all students, faculty members, and school people of Ohio.

Library. The research library contains large quantities of material in the form of manuscripts, pamphlets, bulletins, reports, modern textbooks for elementary and high-school grades, and educational periodicals. This library is in charge of a reference librarian, and her services together with the library material will be utilized in the preparation of bibliographies and reports on problems presented by those engaged in educational work. This applies to students and faculty members as well as those engaged in the work of the public schools. Unless the problem requires extensive investigation, the service will be rendered without charge.

Courses. In order to make the resources of the Bureau serve for research purposes, students desiring to work in the Bureau may register in certain courses listed in the departments of Education and Psychology. Courses must be approved by the chairman of the department and by the Director of the Bureau. Such students will be under the direction and supervision of the Bureau staff members.

Research Problems. Students taking such courses are given practical problems upon which to work. According to the nature and exacting character of the problem and the scholastic status of the student, he may be registered in either of two groups of courses, as follows:

MINOR PROBLEMS. Two to four credit hours. Investigation of minor problems.
Education 600
Psychology 650

INDIVIDUAL PROBLEMS. Two to ten credit hours. Investigation of problems leading to preparation of theses for advanced degrees.
Education 950
Psychology 950

NOTE: Descriptions of these courses, prerequisites, and the divisions into which the two Education courses are divided will be found under the department announcements.

BUREAU OF SPECIAL AND ADULT EDUCATION

Office, 321 Education Building

PROFESSOR BERRY, ASSOCIATE PROFESSOR ROSEBROOK

The function of the Bureau of Special and Adult Education is to promote the education of all types of exceptional children (the handicapped and the gifted) and to further the work of adult education.

Students interested in the work of this Bureau should confer with the Director.

SPECIAL EDUCATION

Field Service. The objectives of field service are as follows: to assist the smaller communities in organizing the work of special education; to serve in an advisory capacity the communities in which special education has already been organized; and to cooperate with state and local organizations in formulating a state program for the protection, treatment and training of all types of exceptional children and for the removal of the causes that handicap children.

Teacher Training. Only persons who have had successful experience in teaching normal children should prepare to teach exceptional children. A student who wishes to prepare to teach mentally retarded children, behavior problem children, or children defective in speech should select courses from those recommended below.

Candidates for the degree of Bachelor of Science in Education interested in teaching exceptional children should register in the Curriculum for Teachers, Supervisors, and Principals in Elementary Schools. In this curriculum students are required to elect 20 additional hours in some one selected field at the junior-senior level. Those interested in special education may meet this requirement by choosing electives from the courses listed below.

All types of exceptional children

Psychology 609. The Exceptional Child
Psychology 616. Individual Testing by the Binet-Simon Method
Education 764. Supervised Teaching in Special Classes
Education 767. Administration of Special Education
Education 897. Seminary in Special Education

Mentally retarded children

Psychology 611. The Mentally Deficient Child
Psychology 613. Mental and Educational Tests
Psychology 622. The Psychology of the Delinquent Child
Education 458. General Wood and Metal Work
Education 765. Principles and Methods of Teaching the Mentally Retarded

Behavior problem children

Psychology 622. The Psychology of the Delinquent Child
Psychology 634. Criminal and Legal Psychology
Psychology 641. Abnormal Psychology
Education 766. Principles and Methods of Teaching Behavior Problem Children
Sociology 625. The Criminal
Social Administration 628. Probation and Parole.

Children defective in speech

Phonetics 604. Clinical Practice in Speech Correction
Phonetics 606. Lip-reading Techniques

Research. Students interested in research problems connected with the work of the Bureau of Special and Adult Education may register in any of the following courses:

Psychology 650. Minor Problems
Psychology 950. Research in Psychology
Education 600-g. Minor Problems
Education 950-j. Research in Education
Phonetics 700. Minor Problems: Human Speech

ADULT EDUCATION

Field Service. The aims of field service are as follows: to aid in the organization of adult study groups; to assist organized groups in formulating programs of study; to prepare and issue courses of study, bulletins and other materials for the use of adult groups; and to cooperate with state and local organizations in furthering the work of adult education.

University Courses. Students interested in taking work in adult education may enroll in any of the following courses:

Education 600-g. Minor Problems
Education 770. Adult Education
Education 950-j. Research in Education
Psychology 650. Minor Problems
Psychology 825. Psychological Problems in Adult Life
Psychology 950. Research in Psychology
Agricultural Extension 501. Extension Methods
Agricultural Extension 600. Extension Education

NOTE: Description of the courses listed above will be found under the department announcements, with the exception of those at the "800" and "900" level which are described in the Graduate School Bulletin only. See College of Agriculture Bulletin for Agricultural Extension 501 and 600.

BUSINESS ORGANIZATION
Office, 107 Commerce Building

PROFESSORS MAYNARD, WEIDLER, HOAGLAND, DICE, HELD, DUFFUS, BECKMAN, AND DAVIS, ASSOCIATE PROFESSORS PIKE, REEDER, CORDELL, DAMERON, E. L. BOWERS, POWER, AND SMART, ASSISTANT PROFESSORS RIDDLE, DONALDSON, WILLIT, KIMBALL, KELLOGG, AND C. W. BOWERS, MR. BURLEY, MR. CHUTE, MR. HAROLD, MR. NOLEN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36. The general prerequisites must include a fundamental course in economics.

614. Business Statistics. Four credit hours. Winter Quarter. Three class meetings and one two-hour laboratory period each week. General prerequisites must include courses in economic statistics and college algebra. Mr. Smart.

Price and production indexes. Analysis of time series. Linear correlation applied to economic and business problems.

621. Business Law: Contracts. Three credit hours. One Quarter. Autumn, Winter, Spring. Mr. Power, Mr. C. W. Bowers.

A course in the law of contracts for the student of business, including the study of the fundamentals of legally binding agreements between persons, and their enforcement.

622. Business Law for Engineers and Architects: Contracts. Three credit hours. One Quarter. Autumn, Winter, Spring. Mr. Power, Mr. C. W. Bowers.

A course in the law of contracts with special reference to engineering and architectural problems and with incidental reference to certain other phases of the law that most closely affect the engineer and architect.

623. Business Law: Agency and Sales. Three credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Business Organization 621. Mr. Pike, Mr. Bowers.

A course in the law of agency and sales for the student of business. The fundamentals of the law governing business transactions of persons through agents and the sale of personal property. A continuation of Business Organization 621.

625. Business Law: Negotiable Instruments. Three credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Business Organization 621. Mr. Bowers.

A course in the laws governing bills of exchange, promissory notes and checks designed to guide the business man in his daily transactions with such instruments.

627. Business Law: Partnerships and Corporations. Three credit hours. One Quarter. Autumn and Winter. General prerequisites must include Business Organization 621. Mr. Pike.

A course designed to give the student of business a practical working knowledge of important laws governing the formation and operation of partnerships and corporations.

629. Business Law: Legal Aspects of Credits and Collections. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Business Organization 621. Mr. Pike.

The course includes in part a study of property as the source of collections and as security for debts; legal instruments of the security type such as mortgage and conditional sales, etc., types of legal procedure in the courts, and duties of the officers thereof with which the creditor is most concerned.

***631. Business Law: The Law of Banks and Banking.** Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Business Organization 621 and 625. Mr. Pike.

A study of legal principles governing the operation of banks and trust departments.

633. Governmental Agencies and Business. Three credit hours. Winter Quarter. Three meetings each week. Mr. Power.

A study of the various administrative agencies created by the local, state, and federal governments for the regulation of business from the viewpoint of the student of business. Particular consideration is given to the organization, jurisdiction and procedure of such administrative agencies and their relation to business.

640. Corporate Organization and Control. Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. Mr. Donaldson.

Types of business enterprise; the corporation; rights, duties, obligations, and liabilities of stockholders, directors, and officers.

642. Real Estate Principles. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. Mr. Hoagland, Mr. Harold.

Principles of real property ownership and real estate practice; types of deeds, leases, restrictions; real estate brokerage, selling, advertising; property management; subdividing and developing; zoning and its effects.

643. Real Estate Finance. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Business Organization 642. Mr. Hoagland, Mr. Harold.

Methods available for financing the ownership or occupancy of real property. Real estate and real estate paper as field of investment. Problems involved in appraisal and practical methods of appraisal.

644. Real Estate Problems. One to three credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite, permission of instructor. Mr. Hoagland, Mr. Harold.

Individual research in the field of real estate, designed for students primarily interested in real estate investments and in possibilities of the real estate business.

645. Trade Associations. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hoagland, Mr. Duffus.

The nature and function of trade associations, and their relation to business and to government.

650. Corporation Finance. Five credit hours. One Quarter. Autumn, Winter, Spring. Five class meetings each week. Mr. Duffus, Mr. Donaldson, Mr. Riddle, Mr. Harold.

Financial structure and problems of modern business corporations.

Not open to students who have credit for or are taking Economics 616.

652. Industrial Finance. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. General prerequisites must include Business Organization 650. Mr. Hoagland, Mr. Kimball.

A study of specific cases involving financial decisions and operations.

***653. Industrial Consolidations and Mergers.** Three credit hours. Autumn Quarter. Three class meetings each week. Given in alternate years. General prerequisites must include Business Organization 640 or 650. Mr. Hoagland, Mr. Duffus.

Historical and analytical study of industrial consolidations and mergers.

* Not given in 1936-1937.

656. Railroad and Public Utility Finance. Three credit hours. One Quarter. Autumn and Winter. Three class meetings each week. General prerequisites must include Business Organization 650. Mr. Duffus, Mr. Riddle.

Financial problems peculiar to public service industries. American railroads and utilities as fields for investment and speculation and their financial administration under state and federal regulation.

657. Investment Analysis. Three credit hours. Winter Quarter. Three meetings each week. General prerequisites must include Business Organization 650. Mr. Riddle.

Principles of security analysis; analysis of individual issues, companies and industries; selection and protection of security holdings; analysis of portfolios.

658. Principles of Investment. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. General prerequisites must include Economics 616 or Business Organization 650. Mr. Riddle.

Functions of investment; economic basis of investment; basic elements in investment; investment programs; investment securities; field of investment; investment and business conditions. All these topics are considered from the point of view of the investor.

659. Investment Banking. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Business Organization 650. Mr. Riddle.

Principles of long-period banking credit; process of investment banking; functions and operations of investment banking institutions; trends and problems of investment banking.

660. The Stock Market. Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. General prerequisites must include Business Organization 650 and a course in money and banking. Mr. Dice, Mr. Donaldson.

The New York Stock Exchange; brokerage houses, methods of trading; business cycles and movements of stock prices; regulation of stock issue and manipulation.

662. The Money Market. Three credit hours. Spring Quarter. General prerequisites must include a course in money and banking. Mr. Dice.

New York as a money market; the acceptance and commercial paper; brokers' loans; business loans; interest and discount rates; control of the supply of money through the Federal Reserve System; present problems and trends.

665. Foreign Exchange. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include a course in money and banking. Mr. Willit.

A study of the theory and practices of foreign exchange from the standpoint of both bankers and foreign traders. The relationship of foreign exchange to international trade and financial problems is included.

666. Practice Work in Banking. One to three hours each Quarter with total credit not to exceed six credit hours. One Quarter. Autumn, Winter, Spring. Students are admitted on the suggestion of the instructor in charge in cooperation with the banks concerned. Mr. Dice.

Students do actual work in a bank. Each student will attend conferences in regard to his work and make reports based on the different bank operations.

670-*671. Bank Organization and Management. Three credit hours. Winter and Spring Quarters. Each Quarter may be taken separately. 670, given in alternate years. General prerequisites must include a course in money and banking, Business Organization 650, and, for 671, Accounting 616. Mr. Dice.

This course deals with the organization and practical operation of banks; their relations to the Federal Reserve System; government control; trends and required reforms.

***674. Savings and Trust Institutions.** Three credit hours. Autumn Quarter. Three class meetings each week. Given in alternate years. General prerequisites must include a course in money and banking. Mr. Willit.

The practical operations and economic significance of the building and loan associations, savings banks, trust companies, and various other institutions are studied.

* Not given in 1936-1937.

680. Industrial Organization and Management. Five credit hours. One Quarter. Autumn, Winter, Spring. Five class meetings each week. Mr. Davis, Mr. Chute, Mr. Nolen.

An examination of the basic fundamentals of management underlying the solution of problems of organization and operation in all business enterprise, followed by their application to such specific fields of industrial management as production, materials, personnel, etc.

684. Industrial Management Field Work. Three to six credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Business Organization 680. Mr. Davis, Mr. Chute.

685. Purchasing, Stores, and Inventory Control. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Davis.

The organization, management and control of materials in industries. Treats particularly of the organization and functions of the purchasing, stores, and material-handling and controlling departments and those parts of the planning, accounting, production, and other departments directly affecting the control of materials.

686. Personnel Organization and Management. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Davis.

The organization, management and control of the personnel in industry. Treats particularly the functions and practice which come within the scope of hiring, force maintenance, industrial education and welfare.

687. Production Organization and Management. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Davis.

The organization, management and control of production in industry. Treats these largely from the point of view of shop management.

691. Office Organization and Management. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Davis.

Mechanics of administration. Office management. Standards, tools, forms, equipment, office machinery, and standard methods. Special office problems of different departments, and of multi-plant organization.

700. Marketing. Five credit hours. One Quarter. Autumn, Winter, Spring. Five class meetings each week. Mr. Beckman, Mr. Reeder, Mr. Cordell, Mr. Maynard, Mr. Burley.

A general but critical survey of the field of marketing. Consumer demand in relation to the marketing machinery. Functions, methods, policies, marketing costs, and problems of the farmer, manufacturer, wholesaler, commission merchant, broker, retailer and other middlemen. Emphasis on principles, trends, and policies in relation to marketing efficiency.

702. Marketing Problems and Market Analysis. Four credit hours. One Quarter. Autumn, Winter, Spring. Four class meetings each week. General prerequisites must include Business Organization 700. Mr. Cordell.

The technique of market research; problems on selected topics in retailing, wholesaling of consumer goods, industrial marketing, sales promotion, and price policies.

705. Retail Merchandising. Four credit hours. One Quarter. Autumn, Winter, Spring. Four class meetings each week. General prerequisites must include Business Organization 700. Mr. Maynard, Mr. Dameron.

A consideration of the organization and management of retail establishments: store location; store organization; buying; receiving; storekeeping; inventories; sales systems; store policies; services; expenses and profits; deliveries; personnel problems, etc.

706. Wholesaling. Four credit hours. Spring Quarter. Four class meetings each week. General prerequisites must include Business Organization 700. Mr. Beckman.

The field of wholesaling; types and classes of wholesale organizations; tendencies in wholesaling; wholesale centers. Organization and management of wholesale establishments including location, purchasing, receiving, stock control, advertising, selling, order filling, traffic management, credit granting, expenses, profits, etc.

709. Credits and Collections. Four credit hours. One Quarter. Autumn, Winter, Spring. Four class meetings each week. General prerequisites must include Business Organization 700. Mr. Beckman, Mr. Cordell.

Credit—nature, functions, instruments, classes, risk, organization and management. Sources of credit information. Collection methods and policies. Extensions, compositions, adjustments, receiverships, bankruptcy, credit insurance, credit limits, credit and collection control.

712. Salesmanship and Sales Management. Four credit hours. One Quarter. Autumn, Winter, Spring. Four class meetings each week. General prerequisites must include Business Organization 700. Mr. Maynard, Mr. Nolen.

Salesmanship topics: knowledge of goods and markets; buying motives; sales planning; study of customers and their wants; meeting objections; closing.

Sales management problems: sales organization; planning; territories; quotas; sales research; selecting and training salesmen; compensation; expenses, stimulation and supervision of salesmen.

716. Principles of Advertising. Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. General prerequisites must include Business Organization 700. Mr. Maynard, Mr. Dameron.

Advertising in relation to marketing and general business. Advertising organization. Science of advertising. Copy layout, typography, engraving. Advertising strategy. Advertising media. Economics of advertising. The viewpoint of the enterpriser emphasized.

717. Advertising Practice. Three credit hours. Winter Quarter. Two recitations and one two-hour laboratory period each week. General prerequisites must include Business Organization 716. It is recommended that this course be preceded by Psychology 635. Mr. Dameron.

The technique of advertising with emphasis on copy and layout. Consideration of marketing factors. Preparation of advertising or campaign. Layout in relation to media. Appeals, space, position, typography, art, illustration. Borders, backgrounds, pointing devices, perspective. Emphasis on consumer advertising in general markets.

719. Retail Advertising. Four credit hours. Spring Quarter. Two recitations, one two-hour laboratory period, and one conference each week. General prerequisites must include Business Organization 717 or the permission of the instructor. Mr. Dameron.

Nature and purpose of retail advertising and sales promotion. Retail advertising organization. Appeals, copy, art, engraving, typography, media. Retail advertising plans. Coordination of selling efforts.

720-721. Exporting and Importing. Three credit hours. Autumn and Winter Quarters. 720 is given in the Autumn Quarter, and 721 in the Winter Quarter. Three class meetings each week. Preferably preceded or accompanied by Business Organization 700, and a course in money and banking. Mr. Held.

Methods of conducting export and import business; foreign trade correspondence and advertising; market analysis; export commission houses and other sales agencies; handling shipments; credits and collections.

725. Field Work in Marketing. Three to six credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Business Organization 700. Open to students in the Marketing group only. Mr. Maynard, Mr. Beckman.

This course is open to students temporarily not in residence. The student is required to submit a report covering certain of the market problems of the company by which he had been engaged.

740. Public Utility Organization and Administration. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Economics 618 or 648. Mr. Power.

The public utility as a business enterprise. The study of its organization and administration. Consideration of the problems of management confronting the utility as a business.

748. Valuation of Railroads and Public Utilities. Three credit hours. Winter Quarter. Three class meetings each week. Given in alternate years. General prerequisites must include Economics 618 or 648. Mr. Power.

A study of the various methods of the valuation of public utilities and the problems arising therefrom. Study is made of typical valuation and rate cases before state public utilities commissions and before the Interstate Commerce Commission.

752. Traffic Management. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Economics 618. Mr. Duffus.

Investigation of the business relationships existing between shippers and carriers in the transportation of goods in domestic and foreign commerce by rail, highway, water, and air.

760. Personal Insurance. Three credit hours. Winter Quarter. Three class meetings each week. Mr. E. L. Bowers.

Life insurance; accident and health insurance; annuities. Premiums; reserves; investments; surrender values; dividends, etc. Types of policies and companies. Adaptation of insurance to individual cases. Agency organization; state supervision.

764. Property Insurance. Three credit hours. Spring Quarter. Three class meetings each week. Mr. E. L. Bowers.

A study of the following lines of insurance: fire and marine; automobile; burglary and robbery; windstorm; plate glass; business interruption. Credit and title insurance, corporate bonding. Types of companies; loss prevention and adjustments; supervision. Insurance as a business opportunity.

799. Special Problems in Business Organization. One to three credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include preliminary courses in the field of specialization. In addition senior or graduate standing or permission of the instructor is required.

Individual investigations of specific problems in the following fields of Business Organization:

(a) Corporation Organization and Finance. Mr. Hoagland and others.
(b) Real Estate Problems. Mr. Hoagland and others.
(c) Insurance. Mr. E. L. Bowers and others.
(d) Marketing. Mr. Maynard and others.
(e) Banking. Mr. Dice and others.
(f) Industrial Management. Mr. Davis and others.
(g) Transportation and Public Utilities. Mr. Duffus and others.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

804. Corporation Finance for Graduate Students. Three credit hours. One Quarter. Winter and Spring. Mr. Hoagland, Mr. Duffus.

A conference course for graduate students. The content for any particular Quarter will be adapted to the needs of the students enrolled for that Quarter and will be announced in advance.

Not open to students who have credit for Business Organization 840.

816. Marketing for Graduate Students. Three credit hours. One Quarter. Autumn and Winter. Mr. Weidler, Mr. Maynard, Mr. Beckman, Mr. Dameron.

A conference course for graduate students. The content for any particular Quarter will adapted to the needs of the students enrolled for that Quarter and will be announced in advance.

820. Problems of Banking and of Stock Prices. One to three credit hours. Spring Quarter. Mr. Dice.

A seminary in the leading problems relating to banking and to stock prices. The desires of the group will determine whether the major part of the course shall be devoted to problems of banking or to problems involved in determining the movements of stock prices.

827. Stock Market for Graduate Students. Three credit hours. Autumn Quarter. Mr. Dice.

A study of the problems involved in judging stock values.

831. Graduate Seminary in Business Organization for Beginning Graduate Students. Two credit hours. Autumn, Winter, and Spring Quarters. Mr. Kellogg.

832. Graduate Seminary in Business Organization for Advanced Students. Two credit hours. Autumn, Winter, and Spring Quarters. All instructors.

833. Graduate Course in Industrial Management. Three credit hours. Autumn Quarter. Mr. Davis.

A conference course for graduate students. The content for any particular Quarter will be adapted to the needs of students enrolled for that Quarter and will be announced in advance.

845. Transportation and Public Utilities for Graduate Students. Three credit hours. One Quarter. Autumn and Winter. Mr. Duffus, Mr. Power.

A conference course for graduate students. The content for any particular Quarter will be adapted to the needs of the students enrolled for that Quarter and will be announced in advance.

950. Research in Business Organization. Autumn, Winter, and Spring Quarters.

Individual investigations, group discussions participated in by those investigating related subjects. The following fields are suggested:

(a) Research in Corporation Organization and Finance. Mr. Hoagland, Mr. Duffus, Mr. Riddle, Mr. Donaldson.

(b) Research in Real Estate Problems. Mr. Hoagland.

(c) Research in Insurance. Mr. E. L. Bowers.

(d) Research in Marketing. Mr. Weidler, Mr. Maynard, Mr. Beckman, Mr. Reeder, Mr. Cordell, Mr. Dameron.

(e) Research in Banking. Mr. Dice, Mr. Willit.

(f) Research in Industrial Management. Mr. Davis.

(g) Research in Transportation and Public Utilities. Mr. Duffus, Mr. Power.

CERAMIC ENGINEERING
Office, 131 Lord Hall

PROFESSORS WATTS AND BOLE (RESEARCH), ASSOCIATE PROFESSORS CARRUTHERS AND KING, MR. McSWINEY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

600. Theory of Drying. Three credit hours. Autumn Quarter. Three lectures and six hours of preparation each week. General prerequisites must include two Quarters of college physics. Mr. Carruthers.

A study of the fundamental physical laws and ceramic technology involved in drying ceramic wares and their application to commercial practice.

601. Driers, Kilns, and Theory of Firing. Five credit hours. Winter Quarter. Five lectures and ten hours of preparation each week. General prerequisites must include Ceramic Engineering 600. Mr. Carruthers.

A study of the fundamental principles involved in firing ceramic wares, their application in various ceramic processes and the various types of driers and kilns used in ceramic plants.

603. Elements of Ceramic Plant Engineering. Five credit hours. Winter Quarter. Five lectures and ten hours of preparation each week. General prerequisites must include Ceramic Engineering 600. Mr. Carruthers.

A study of the basic processes and equipment used in ceramic manufacturing, including grinding, sizing, filtration, draft, heat transfer, and extrusion.

605. Bodies, Glazes, and Colors. Four credit hours. Spring Quarter. Four lectures each week. General prerequisites must include Ceramic Engineering 615. Mr. Watts.

Ceramic bodies, glazes, and colors.

610. Refractories and their Uses. Five credit hours. Spring Quarter. Five lectures each week. Mr. King.

Lectures on refractories, their physical and chemical compositions and properties, their utilization and testing.

615. Ceramic Calculations. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include courses in metallurgical and ceramic analysis. Mr. King.

Solution of chemical and physical problems involved in compounding ceramic mixtures, including wet blending. Also instruction in development of series, containing one, two, and three variables.

620. Physical and Chemical Measurements of Clays and Other Ceramic Materials. Five credit hours. Winter Quarter. Two recitations and eight laboratory hours each week. General prerequisites must include Ceramic Engineering 615, Chemistry 681, and a course in ceramic laboratory. Mr. King.

Application of physical chemical laws to ceramic materials and compounds. Laboratory practice in determination of the essential physical and chemical properties of ceramic mixtures and compounds in the plastic, dry, vitrified, and fused states.

701. Ceramic Investigations. Five credit hours. Autumn Quarter. Conference, library, and laboratory work. General prerequisites must include Ceramic Engineering 605, 615, 620. Mr. Watts, Mr. King.

Detailed studies and definite problems having practical application in one or more of the following fields of ceramic technology: (a) stoneware; (b) terra cotta; (c) saggers; (d) metal enamels.

702. Ceramic Investigations. Five credit hours. Winter Quarter. Conference, library, and laboratory work. In addition to the general prerequisites, senior or graduate standing in Ceramic Engineering is required. Mr. Watts, Mr. Bole.

Detailed studies and definite problems having application in either of the following fields of ceramic technology: (a) earthenware, china, and porcelains; (b) structural clay products.

703. Ceramic Investigations. Five credit hours. Spring Quarter. Conference, library, and laboratory work. In addition to the general prerequisites, senior or graduate standing in Ceramic Engineering is required. Mr. Watts, Mr. King.

Detailed studies and definite problems in practical applications in either of the following fields of ceramic technology: (a) glazes and colors; (b) refractories.

705. Ceramic Designing. Five credit hours. Autumn Quarter. One lecture, one quiz, and eight laboratory hours each week. General prerequisites must include Ceramic Engineering 601 and Mechanics 602. Mr. Carruthers.

Designing of clay plant structures and equipment such as buildings, bins, and retaining walls. Practical problems in structural design and storage of clays.

706. Ceramic Designing. Five credit hours. Winter Quarter. One lecture, one quiz, and eight laboratory hours each week. General prerequisites must include Ceramic Engineering 705. Mr. Carruthers.

A continuation of Ceramic Engineering 705. Study of drying and fan problems and the design of driers.

707. Ceramic Designing. Five credit hours. Spring Quarter. One lecture, one quiz, and eight laboratory hours each week. General prerequisites must include Ceramic Engineering 706. Mr. Carruthers.

A continuation of Ceramic Engineering 706. Study of firing and factory equipment problems and design of kilns and complete clay plants.

708. Technology of Glass. Three credit hours. Autumn Quarter. Two lectures and three laboratory hours each week. General prerequisites must include Ceramic Engineering 615. Mr. McSwiney.

Practice in melting typical glass batches. Studying physical behavior during the melting process and in the molten state. Measurement of some of the physical properties of the glass produced experimentally and of commercial glasses.

750. Special Problems. Two to seven credit hours. Autumn, Winter, and Spring Quarters. Conference, library, and laboratory work. General prerequisites must include fundamental ceramic engineering courses. Consent of department is required. This course may be repeated for different problems or continuation of original problem, with total credit not to exceed fifteen hours. All instructors.

This course is designed to permit any properly qualified student to avail himself of the library and laboratory facilities of the department for carrying on a special investigation or for adding to his knowledge and technique in some ceramic subject.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites must include satisfactory training in qualitative and quantitative analysis, a knowledge of the general principles of ceramic technology, a knowledge of mathematics through calculus and analytical mechanics, at least a one year's course in physics, with laboratory and problem work, and engineering drawing.

810-811-812. Porcelain for Electrical and Other Special Purposes. Two credit hours. Autumn, Winter, and Spring Quarters. Mr. Watts.

815. Seminary in Ceramic Engineering. One to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Watts, Mr. Bole, Mr. Carruthers, Mr. King.

The course consists of conference and reports on problems in ceramic technology and engineering. Topics are chosen to cover the development of the ceramic industry.

950. Research in Ceramic Engineering. Autumn, Winter, and Spring Quarters. Prerequisite, permission of the instructor in charge.

Research in ceramic technology and engineering, in analytical and physical chemistry of ceramic materials and mixtures, in mineralogy and geology of ceramic deposits, in physical and chemical testing of ceramic materials and products, under Mr. Watts, Mr. Bole, or Mr. King; in the engineering, designing and testing of ceramic apparatus processes and structures, under Mr. Carruthers; in ceramic whitewares, under Mr. Watts; in refractories and metal enamels, under Mr. King. The student may spend a part or all of his time on research work.

CHEMICAL ENGINEERING

Offices, 179, 180 Chemistry Building

PROFESSOR WITHROW, ASSISTANT PROFESSORS DUNCOMBE AND KOFFOLT, MR. FEINBERG, MR. DAVIS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

691. Elements of Chemical Engineering. Two credit hours. Autumn Quarter. Two lecture-recitation periods each week. Physical chemistry must be included in the general prerequisites or must be taken concurrently. Mr. Duncombe, Mr. Withrow.

A thorough discussion of the engineering operations utilized in the chemical branch of engineering with emphasis on the requirements of the market and economics and of the process and their effect on the engineering used. The work of the course is confined to those operations largely utilized where solids are concerned such as crushing, screening, filtration, lixiviation, etc., and is directed toward a study of the fundamental principles involved, the engineering equipment available and by means of problems, the application of science and mathematics.

Not open to students who have credit for Chemical Engineering 700.

692. Elements of Chemical Engineering. Two credit hours. Winter Quarter. Two lecture-recitation periods each week. Physical chemistry must be included in the general prerequisites or must be taken concurrently. Mr. Duncombe, Mr. Withrow.

A continuation of the study of engineering operations constituting the body of Chemical Engineering concerned with those operations largely utilized where liquids and gases are concerned, such as evaporation, distillation, drying, liquefaction, absorption, etc. Examples of special design requirements for processes such as carbonization, nitration, sulfonation, etc., as well as catalytic processes are studied with respect to the principles involved and the engineering equipment developed to carry out these processes. Emphasis is placed upon the concept of separations, such as the engineering requirement of the separation of solids from solids, from liquids, from gases, liquids from solids, from liquids, etc.

Not open to students who have credit for Chemical Engineering 700.

701-702. Industrial Chemistry. Three credit hours. Autumn and Winter Quarters. Three lectures each week. Physical chemistry must be included in the general prerequisites or must be taken concurrently, except with special permission of the instructor. Mr. Withrow.

The fundamental lecture course in industrial chemistry, dealing with the problems of the chemical industries, and placing stress upon the economic questions involved in chemical manu-

facturing, materials of plant construction, as well as the engineering operations involved in chemical engineering, and the principles underlying the applications of chemistry and engineering to a selected number of chemical industries. The work of the Autumn Quarter deals especially with the inorganic industries, while that of the Winter Quarter is related to the organic industries.

703. Inspection Trip to the East. No credit hours. Week of May 1, 1937, and odd-numbered years thereafter. In addition to the general prerequisites, permission of the instructor is required. Mr. Withrow, Mr. Koffolt.

The trip includes Akron, Ohio; Albany, New York City, Long Island, and West Sayville, New York; Jersey City, Grasselli, and Deep Water Point, New Jersey; Wilmington, Baltimore, and Curtis Bay, Maryland; and Washington, D. C. The entire expense need not exceed $80.00. A satisfactory written report upon the work of the trip and an examination are required.

***704. Inspection Trip to the West.** No credit hours. Week of May 1, 1938, and even-numbered years thereafter. In addition to the general prerequisites, permission of the instructor is required. Mr. Withrow, Mr. Koffolt.

The trip includes Dayton, West Carrollton, Hamilton, Cincinnati, and Ivorydale, Ohio; Kensington, Illinois; Grasselli and Whiting, Indiana; Chicago and Argo, Illinois; Detroit, Wyandotte, and Midland, Michigan. The entire expense need not exceed $55.00. A satisfactory written report upon the work of the trip and an examination are required.

705. Written Reports. No credit hours. Spring Quarter. Week of May 1. General prerequisites must include Chemical Engineering 701-702. Mr. Withrow.

A substitute course for Chemical Engineering 703 or 704, allowed only upon presentation of reasons satisfactory to the instructor in charge. The course consists of assigned reading designed to familiarize the student with all that can be found in the literature or plants regarding chemical engineering, and specified chemical processes, together with a full written report.

706. Chemical Engineering and Industrial Chemistry Laboratory. Two to five credit hours. Autumn Quarter. One hour conference and five to fourteen laboratory hours each week. General prerequisites must include an acceptable course in analytical chemistry. Chemical Engineering 701 must also be included in these general prerequisites or must be taken concurrently. Mr. Withrow, Mr. Koffolt, Mr. Feinberg, Mr. Davis.

An introduction to industrial chemical research through assigned manufacturing problems, beginning with the general chemical industries. The specific problems are so chosen as to disclose the fundamental principles underlying the assigned industry, and practice is afforded in the preparation of written reports. Opportunity is given for study of operating efficiency of certain engineering equipment utilized in the fundamental engineering operations of chemical engineering. Weekly inspection trips are taken to plants in and around Columbus for study and report upon equipment and operation. Great emphasis is laid upon methods of attacking problems and upon organization of reports. Certain types of problems with engineering equipment, in factory research and in applied electrochemistry, are required of all students, after which opportunity is given the student to select special problems in various portions of the fields of industrial chemistry and chemical engineering such as absorption systems, filtration, petroleum and sugar technology, intermediates, wood distillation, insecticides, starch, lime, chlorine, and plant fume questions.

707. Engineering Chemistry, Chemical Engineering Laboratory. Three credit hours. Winter Quarter. One conference and eight laboratory hours each week. General prerequisites must include Chemical Engineering 706. Chemical Engineering 702 must be taken concurrently. Mr. Withrow, Mr. Koffolt, Mr. Feinberg, Mr. Davis.

A continuation of Chemical Engineering 706. Special emphasis is laid upon technical methods of control as applied to industrial chemical processes, and upon control for technical products according to standard American Society for Testing Materials methods and with standard equipment.

708. Practical Experience in Chemical Engineering Work. Six credit hours. General prerequisites must include Chemical Engineering 700 or 691-692. Mr. Withrow.

Academic credit for this course is based on the reports of a student who has had practical experience of a chemical engineering character in a semi-responsible position covering a more advanced grade of work than that required in Chemical Engineering 501.

The student shall present a satisfactory report, the outline and basis of which, it is preferred, shall be arranged in conference prior to beginning the work. In general the report shall

* Not given in 1936-1937.

cover in very considerable detail, the particular industry with which the student is connected, in respect to market demand and economics, chemistry involved, engineering operations, plant layout, special equipment and design, operation methods, costs and efficiencies (in so far as this information is obtainable), labor problems, and safety and health hazards, together with other pertinent matter. Flow sheets, production schedules, sketches and photographs to illustrate the report, are especially to be desired.

The student also who has had twelve months' or more experience in industry may present a report which, if satisfactory, will be accepted in lieu of the above requirements.

710. Applied Electrochemistry. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Chemistry 681-682-683 or special permission of the instructor must be obtained. Mr. Withrow, Mr. Feinberg.

A survey of the electrochemical industries and a discussion of the principles underlying the application of the electric current in chemical industries.

712-713-714. Advanced Chemical Engineering Machinery Laboratory. Two to six credit hours. Autumn, Winter, and Spring Quarters. One conference and five to seventeen laboratory hours each week. General prerequisites must include Chemical Engineering 706-707 or special permission of the chairman of the department must be obtained. Mr. Koffolt, Mr. Withrow.

An advanced course of minor problems dealing with various chemical engineering equipment with the view of acquainting students with all types of equipment, their design, and operation. The application of thermodynamics and graphics to chemical engineering problems.

The conferences cover topics chosen from the field of chemical engineering. Specific topics are given each Quarter.

Students may repeat these courses with credit, with the approval of the chairman of the department, inasmuch as the topics vary from year to year. The following is a list of topics from which work in this course is chosen: Graphical Chemical Engineering Computations, Drying, Humidification, Dehumidification, Adsorption, Absorption, Fume and Smoke, Crystallization, Filtration, Crushing and Grinding, Furnace and Pyrometry, Evaporation, Refrigeration, Distillation, Cracking, Heat Transfer, and Flow of Fluids.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites must include courses in qualitative and quantitative analysis, and an introductory course in organic chemistry and physics. Preparation in mathematics through calculus with some engineering drawing and mineralogy, although not required, is desirable.

801. Introductory Problems in Chemical Engineering. Two to five credit hours. Autumn, Winter, and Spring Quarters. Conference, library and laboratory work. General prerequisites must include satisfactory courses in the field of the problem undertaken. The course may be repeated on other problems as desired. Mr. Withrow, Mr. Duncombe, Mr. Koffolt.

The work of the course is carried on by individual conference, library, and laboratory work and consists of problems involving an introduction to the application of physics, mathematics, drawing, mechanics, and chemistry in the field of chemical engineering.

900-901-902. Advanced Industrial Chemistry and Chemical Engineering. Two to five credit hours. Autumn, Winter, and Spring Quarters. One hour conference and five to fourteen laboratory hours each week. General prerequisites must include acceptable courses in industrial chemistry, or the permission of the instructor must be obtained. Mr. Withrow.

An advanced course dealing with the solution of minor problems in industrial chemistry and chemical engineering. Special work will be planned along lines in industrial chemistry or chemical engineering as may be desired by the individual student.

905-906-907. Seminary in Industrial Chemistry and Chemical Engineering. Two credit hours. Autumn, Winter, and Spring Quarters. Two conference hours each week. General prerequisites must include satisfactory courses in industrial chemistry. Mr. Withrow, Mr. Duncombe, Mr. Koffolt.

The course consists of conferences and reports upon methods of attacking special problems in industrial chemistry and chemical engineering. The topics vary from Quarter to Quarter, keeping in touch with the constant development of chemical industry.

950. Research in Industrial Chemistry and Chemical Engineering. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. Library, con-

ference, and laboratory work. General prerequisites must include satisfactory courses in the chosen field of research. Mr. Withrow, Mr. Duncombe, Mr. Koffolt.

Advanced research problems and dissertation in industrial chemistry, applied electrochemistry, and in chemical engineering.

CHEMISTRY

Office, 115 Chemistry Building
General Chemistry Office, 112 Chemistry Building

PROFESSORS EVANS, McPHERSON, HENDERSON, FOULK, BOORD, AND FRANCE, ASSOCIATE PROFESSORS BRODE, JOHNSTON, MOYER, AND WOLFROM, ASSISTANT PROFESSORS HOLLINGSWORTH, FERNELIUS, BACHMAN, AND QUILL, MR. HARRIS, MR. GARRETT, MR. HOARD, MR. ALBERTS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Prerequisite for Graduate Work: The student must have had approximately 50 Quarter hours (33 semester hours) of undergraduate work in chemistry. This requirement must include general inorganic chemistry, qualitative and quantitative analysis, introductory courses in organic and physical chemistry, including laboratory work in all subjects.

621. Advanced Quantitative Analysis. Three to five credit hours. Autumn Quarter. One conference and nine or twelve laboratory hours each week. General prerequisites must include acceptable courses in quantitative analysis. Mr. Foulk.

An extension of the first year's work in quantitative analysis, including electrometric titrations, colorimetric and turbidimetric analysis, and hydrogen ion determinations.

622. General Quantitative Analysis. Three credit hours. Winter Quarter. Three lectures or recitations each week. General prerequisites must include acceptable courses in quantitative analysis. Mr. Foulk.

General principles of chemical analysis.

624. Advanced Qualitative Analysis. Five credit hours. Spring Quarter. Two recitations and nine laboratory hours each week. General prerequisites must include acceptable courses in qualitative and quantitative analysis, or the permission of the instructor in charge. Mr. Foulk.

This course emphasizes the application of physico-chemical principles to the problems of qualitative analysis. The rarer elements are included in the laboratory exercises.

625. Water Analysis. Five credit hours. Spring Quarter. Three lectures and six laboratory hours each week. General prerequisites must include acceptable courses in quantitative analysis. Mr. Foulk.

Methods of sanitary and industrial water analysis, and interpretation of the analytical results.

627. Industrial Water Problems. Three credit hours. Winter Quarter. Three lectures or recitations each week. Given in alternate years. General prerequisites must include acceptable courses in quantitative analysis. Mr. Foulk.

Chemistry of scale formation, foaming and priming in steam boilers, corrosion in hot and cold water systems, and the purification of water for industrial use.

628. Spectroscopic Analysis. Three to five credit hours. Winter Quarter. One lecture and two to four laboratory hours each week. General prerequisites must include acceptable courses in quantitative analysis. Mr. Brode.

General principles of spectroscopic qualitative identification and quantitative estimation of the elements. Spectrophotometry and absorption spectra determinations of organic and inorganic compounds, special applications to metallurgy, plant and biochemical analysis, identification of dyes and organic compounds.

641. Qualitative Organic Analysis. Three credit hours. Spring Quarter. One lecture and six laboratory hours each week. General prerequisites must include acceptable courses in laboratory work in organic chemistry. Mr. Brode.

A study of the systematic methods of separation, purification, and identification of organic compounds.

642. Quantitative Organic Analysis. Three credit hours. Spring Quarter. One lecture and six laboratory hours each week. General prerequisites must include acceptable courses in laboratory work in organic chemistry. Mr. Boord.

Practice in the standard methods for the quantitative analysis of organic compounds, including combustion, and the quantitative estimation of organic radicals present in various compounds.

645-646. Organic Chemistry. Three credit hours. Autumn and Winter Quarters. Three lectures or recitations each week. General prerequisites must include acceptable courses in general and analytical chemistry. Arts-Medicine, Premedical, and Pharmacy groups. Mr. McPherson, Mr. Brode.

The fundamental course in organic chemistry. Chemistry 645 is devoted to a discussion of the aliphatic hydrocarbons and their derivatives and Chemistry 646 to a discussion of the coal tar compounds.

Not open to students who have credit for Chemistry 451-452. Not available for graduate credit for students majoring in chemistry.

647-648. Organic Chemistry. Three credit hours. Autumn and Winter Quarters. Three lectures or recitations each week. General prerequisites must include acceptable courses in general and analytical chemistry. Arts-Chemistry, Chemical Engineering, Education, and Pharmacy groups. Mr. Boord.

The fundamental course in organic chemistry. Chemistry 647 is devoted to a discussion of the aliphatic hydrocarbons and their derivatives and Chemistry 648 to a discussion of the coal tar compounds.

Not open to students who have credit for Chemistry 451-452. Not available for graduate credit for students majoring in chemistry.

649-650. Organic Chemistry: Laboratory. Three credit hours. Autumn and Winter Quarters. Nine laboratory hours each week. Chemistry 645-646 or 647-648 must be included in the general prerequisites or taken concurrently. Mr. Brode, Mr. Boord, and assistants.

The laboratory work naturally belonging to Chemistry 645-646 or 647-648. The preparation of a series of typical organic compounds, their purification, and a study of their properties.

Chemistry 649 is not open to students who have credit for Chemistry 451-452. Not available for graduate credit for students majoring in chemistry.

***654. X-rays and Crystal Structure.** Three credit hours. Winter Quarter. Three lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Given in alternate years. Mr. Harris, Mr. Blake, Mr. McCaughey.

This course is designed for those students of physics, chemistry, and mineralogy who intend to do research work in crystal structures and X-ray analysis.

This course is the same as Mineralogy 654 and Physics 654.

Not open to students who have credit for Physics 814.

661. Advanced Inorganic Chemistry. Three credit hours. Autumn Quarter. Three lectures or recitations each week. General prerequisites must include two years of courses in chemistry. Mr. Henderson, Mr. Fernelius.

An advanced course in inorganic chemistry with emphasis upon the binary inorganic compounds, their preparation, classifications, reactions, and pertinent theory.

662. Advanced Inorganic Chemistry. Three credit hours. Winter Quarter. Three lectures or recitations each week. General prerequisites must include two years of courses in chemistry. Mr. Henderson.

An advanced course in inorganic chemistry with emphasis upon the ternary and complex inorganic compounds, their preparation, classifications, reactions, and pertinent theory.

* Not given in 1936-1937.

663. The Rare Elements. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Chemistry 661 or equivalent. Mr. Henderson.

Lectures on the chemistry of the less familiar elements, emphasizing their relations to the well-known elements, as well as their technical applications.

***668. Non-aqueous Solvents.** Three credit hours. Spring Quarter. Three lectures or recitations each week. Given in alternate years. General prerequisites must include acceptable courses in physical chemistry. Mr. Fernelius.

A consideration of the solvent properties of various solvents, electrical conductance of non-aqueous solutions, the nature of acidity, systems of compounds and evidence obtained from studies of liquid ammonia solutions of metals and inter-metallic compounds, which contributes to an understanding of the nature of the metallic state.

672. Inorganic Chemistry: Laboratory. Three credit hours. Spring Quarter. Nine laboratory hours each week. General prerequisites must include acceptable courses in general chemistry and quantitative analysis. Mr. Henderson, Mr. Fernelius.

a. Inorganic Preparations. Methods employed in the preparation of pure inorganic compounds. The chief classes of such compounds. The laboratory preparation of a number of examples sufficient to develop reasonable technique in applying the methods and to illustrate the classes.

b. Rare Elements. Laboratory work illustrative of the chemistry of the less familiar elements. The preparation of pure compounds of the rare elements using in many cases ores or industrial concentrates as starting materials.

c. Advanced Techniques. The use of some of the newer and more difficult techniques in the field of inorganic syntheses. These techniques include the use of liquefied gases, low and high temperature apparatus, high pressure and high vacua apparatus, etc.

***675. The Phase Rule.** Two credit hours. Spring Quarter. Two meetings each week. Given in alternate years. General prerequisites must include acceptable courses in physical chemistry. Mr. Henderson.

A study of the phase rule and its applications in chemical research.

680. Physical Chemistry. Three credit hours. Autumn Quarter. Three lectures or recitations each week. Prerequisite, acceptable courses in analytical chemistry, physics and calculus. Mr. France.

An introductory course in physical chemistry, adapted to the needs of students of ceramics.

681-682-683. Physical Chemistry. Three credit hours. Autumn, Winter, and Spring Quarters. Three lectures each week. Acceptable courses in organic chemistry, physics, and two Quarters of calculus must be included in the general prerequisites or taken concurrently. Mr. France, Mr. Johnston, Mr. Harris, and assistants.

The fundamental course in physical chemistry, arranged for students specializing in chemistry.

691-692-693. Physical Chemistry: Laboratory. Two credit hours. Autumn, Winter, and Spring Quarters. Six laboratory hours each week. An acceptable course in physical chemistry must be included in the general prerequisites or taken concurrently. Mr. France, Mr. Johnston, Mr. Brode, Mr. Harris, and assistants.

Introduction to physico-chemical measurements. Any one of these courses may be taken in any Quarter. The work may be selected from the following topics according to the needs of the student.

a. Fundamental physico-chemical measurements, such as molecular weight, surface tension, viscosity, vapor pressure, heat of reaction, velocity of reaction, transition points, etc.

b. Electro-chemical measurements, such as conductivity, transport numbers, electrode potentials, over-voltage, hydrogen ion concentrations, etc.

c. Colloid chemistry.

d. Ultra-microscopy.

e. Application of spectroscopy to chemical problems.

695. Colloid Chemistry. Three credit hours. Winter Quarter. Three lectures or recitations each week. General prerequisites must include acceptable courses in chemistry and physics. Mr. France.

A fundamental course in colloid chemistry.

* Not given in 1936-1937.

696. Theoretical Electrochemistry. Three credit hours. Autumn Quarter. Three lectures or recitations each week. General prerequisites must include acceptable courses in physical chemistry. Mr. France.

A fundamental course in theoretical electrochemistry.

701. Minor Problems in Chemistry. One to fifteen credit hours. Any Quarter. Conference, library, and laboratory work. General prerequisites must include satisfactory courses in the field of the problem undertaken. A student may repeat this course and may spend all or any part of his time on it during a Quarter.

This course is designed to permit any properly qualified person to avail himself of the library and laboratory facilities of the department for carrying out a minor investigation or for adding to his knowledge and technique in some chemical subject.

A student may exercise entire freedom in his choice of instructor to conduct his work in this course, but as a rule, topics in organic chemistry will be under the direction of Mr. McPherson, Mr. Evans, Mr. Boord, Mr. Brode, Mr. Wolfrom, Mr. Bachman, Mr. Alberts; in inorganic chemistry, under Mr. Henderson, Mr. Fernelius, Mr. Quill; in physical chemistry, under Mr. France, Mr. Johnston, Mr. Fernelius, Mr. Harris, Mr. Garrett, Mr. Hoard; in analytical chemistry, under Mr. Foulk, Mr. Hollingsworth, Mr. Moyer, Mr. Brode; and in colloid chemistry and electrochemistry, under Mr. France.

782. Chemical Bibliography. One credit hour. Autumn Quarter. One conference each week. General prerequisites must include acceptable courses in analytical and organic chemistry. Mr. Henderson.

Designed to train the advanced student in the use of the chemical library, and to instruct him in the character of various chemical journals, dictionaries, reference books, and other sources of information pertaining to chemical subjects.

783. Chemical Biography. One credit hour. Winter Quarter. One lecture each week. General prerequisites must include acceptable courses in analytical and organic chemistry. Mr. Henderson.

Designed to familiarize the advanced student with the leading personages in chemistry, particularly those of recent and contemporary times, as well as with the available sources of information relating to such personages.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 684.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include a thorough preparation in general inorganic chemistry, qualitative and quantitative analysis and introductory courses in organic chemistry and in physical chemistry (including laboratory courses in both subjects), acceptable courses in physics and mathematics, including calculus.

Requirements for the Master's Degree: (a) The course requirements for the Master's degree are not rigidly fixed, but the program of work should lead to an adequate and well-rounded foundation for advanced work. These courses should be supplemented by others selected from the candidate's field of specialization and in conference with his adviser. (b) The candidate must give evidence of his ability to read chemical papers in either French or German. (c) About two weeks prior to the date proposed for conferring the degree the candidate must pass a written examination. Should the graduate record of the candidate be wholly satisfactory, the scope of the examination would be confined to the candidate's field of specialization.

Requirements for the Degree of Doctor of Philosophy: (a) The candidate should arrange his first year's courses in a way that will broaden his knowledge of the four general provinces of Chemistry. (b) He should acquire such broad familiarity with his special field of concentration in Chemistry as may reasonably be expected from courses and seminaries available, from laboratory experience and from habitual use of the chemical library (especially current literature); he should be reasonably familiar with the use of the chemical library, with eminent chemical personages, and with the outline of the historical development of chemical science; and he must possess a reading knowledge (in chemical literature) of both French and German. (c) A Divisional Examination will be held in the Autumn Quarter. This should be taken normally at the beginning of the candidate's second year of graduate work. This examination will be written and will cover the following four divisions of the science; analytical, inorganic, organic, and physical. (d) For admission to candidacy, the candidate must take an examination in the Autumn Quarter, and at the time that corresponds as nearly as possible to the beginning of his third year of graduate progress. This examination will be written and oral, and will be limited to the candidate's division of specialization in chemistry.

822. Seminary in Analytical Chemistry. Three credit hours. Autumn Quarter. Three conferences each week. General prerequisites must include acceptable courses in analytical, organic, and physical chemistry. Mr. Foulk.

Topic for 1936-1937: Recent Advances in Analytical Chemistry.

823. Seminary in Analytical Chemistry. Two credit hours. Winter Quarter. Two conferences each week. General prerequisites must include acceptable courses in quantitative analysis and organic chemistry. Mr. Moyer.

Topic for 1936-1937: Electrometric Titration and Determination of pH Values.

830. Historical Chemistry. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include acceptable courses in organic chemistry. Mr. Henderson.

A general course in the history of chemistry with special reference to the development of the theories of the science.

841. Advanced Organic Chemistry. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include acceptable courses in organic chemistry including laboratory work. Mr. Boord.

An advanced course in the fundamental principles of organic chemistry, covering the chain hydrocarbons and their derivatives.

842. Advanced Organic Chemistry. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include acceptable courses in organic chemistry including laboratory work. Mr. Boord.

A continuation of Chemistry 841, covering the carbocyclic compounds, including aromatic, hydroaromatic, and terpene derivatives.

843. Advanced Organic Chemistry. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include acceptable courses in organic chemistry including laboratory work. Mr. Brode.

A continuation of Chemistry 841 and 842 covering the heterocyclic compounds with special emphasis upon nitrogen derivatives.

844-845. Advanced Organic Chemistry: Laboratory. Three credit hours. Autumn and Winter Quarters. Nine hours of library, conference, and laboratory work each week. Chemistry 841 and 842 must be included in the general prerequisites or taken concurrently. Mr. Boord, Mr. Brode, Mr. Wolfrom, Mr. Evans, Mr. France, Mr. Bachman.

An advanced course in the synthesis of aliphatic (Autumn) and aromatic (Winter) compounds and a study of their chemical characteristics. Selection may be made from the following topics to supplement the student's previous training and to develop his laboratory technique:

I. Synthetic Preparations, involving the use of the standard procedures for alkylation, esterification, condensation, ring closure, oxidation, reduction and nuclear substitution. Particular emphasis will be placed upon the yields and purity of products.

II. Special Methods and Techniques.

a. Catalytic hydrogenation.
b. Electro-chemical preparations.
c. Resolution of optically active compounds.
d. Preparation of research intermediates.

These courses lead directly to minor research problems in the field of organic chemistry.

850. Seminary in Organic Chemistry. Three credit hours. Autumn Quarter. Three conference hours each week. General prerequisites must include Chemistry 841-842. Mr. Brode.

Topic for 1936-1937: Stereo-isomerism.

851. Seminary in Organic Chemistry. Three credit hours. Winter Quarter. Three conference hours each week. General prerequisites must include Chemistry 841-842. Mr. Evans.

Topic for 1936-1937: The Chemistry of the Saccharides.

852. Seminary in Organic Chemistry. Three credit hours. Spring Quarter. Three conference hours each week. General prerequisites must include Chemistry 841-842. Mr. Boord.

Topic for 1936-1937: Aliphatic Hydrocarbons.

854. Seminary in Organic and Inorganic Chemistry. Three credit hours. Offered in Summer Quarter only. In addition to the general prerequisites, graduate standing in chemistry is required. Mr. Wolfrom.

Topic for the Summer Quarter, 1936: Recent Advances in Organic Chemistry.

Open to auditors and advanced students not working for credit.

861-862-863. Physical Chemistry: Laboratory. Two or three credit hours. Autumn, Winter, and Spring Quarters. Nine laboratory hours each week. General prerequisites must include acceptable courses in physical chemistry including elementary laboratory work. Mr. France, Mr. Johnson, Mr. Harris, and assistants.

Advanced courses in physico-chemical experimental work designed to illustrate the more important principles of physical chemistry, to develop skill in this type of laboratory work and to form a basis for research. Any one of these courses may be taken in any Quarter.

***865. Atomic Structure.** Three credit hours. Winter Quarter. Three lectures or conferences each week. General prerequisites must include acceptable courses in physical chemistry. Mr. Johnston.

A survey of the modern theories of the structure of the atom.

866. Seminary in Inorganic Chemistry. Two credit hours. Autumn Quarter. Two conferences each week. General prerequisites must include acceptable courses in physical chemistry. Mr. Quill.

Topic for 1936-1937: The Rare Earths.

867. Seminary in Inorganic Chemistry. Two credit hours. Winter Quarter. Two conferences each week. General prerequisites must include acceptable courses in physical chemistry. Mr. Henderson, Mr. Fernelius.

Topic for 1936-1937: Valence and Valence Theories.

881-882-883. Lectures in Advanced Physical Chemistry. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Chemistry 681-682-683. Given in alternate years in lieu of Chemistry 887-888-889. Mr. Harris.

A number of topics of special interest to physical chemists at the present time will be treated, such as special topics from the field of kinetics of chemical reactions, kinetics of adsorption and of evaporation from liquid and solid surfaces, dielectric constants, wave-mechanical theory of chemical bonds, photochemistry, etc.

***887-*888-*889. Lectures in Advanced Physical Chemistry.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Chemistry 681-682-683. Given in alternate years in lieu of Chemistry 881-882-883. Mr. Johnston.

Training in the use of thermodynamics as a tool for solving chemical problems. Topics to be discussed include: vapor pressure; solutions and solubility; molecular spectra; free energy; modern theories of electrolytic dissociation; galvanic cells; and the various factors associated with the measurement and control of chemical equilibria.

891. Seminary in Colloid Chemistry and Electrochemistry. Three credit hours. Winter Quarter. Three conferences each week. General prerequisites must include acceptable courses in chemistry and physics. Mr. France.

Topic for 1936-1937: Colloid Chemistry and Surface Reaction.

892. Seminary in Physical Chemistry. Three credit hours. Autumn Quarter. Three conferences each week. General prerequisites must include Chemistry 681-682-683. Mr. Johnston.

Topic for 1936-1937: Photo-chemistry.

950. Research in Chemistry. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the chosen field of research. The student may spend a part or all of his time on research work.

Research work in organic chemistry is conducted under the supervision of Mr. McPherson, Mr. Evans, Mr. Boord, Mr. Brode, Mr. Wolfrom, Mr. Bachman, Mr. Alberts; in inorganic chemistry under Mr. Henderson, Mr. France, Mr. Fernelius, Mr. Quill; in physical chemistry under Mr.

* Not given in 1936-1937.

France, Mr. Johnston, Mr. Fernelius, Mr. Harris, Mr. Garrett, Mr. Hoard; in analytical chemistry under Mr. Foulk, Mr. Hollingsworth, Mr. Moyer, Mr. Brode; and in colloid chemistry and electrochemistry, under Mr. France.

NOTE: Attention is called to the fact that courses in physiological chemistry are listed elsewhere in this Bulletin under the Department of Physiological Chemistry and Pharmacology.

NOTE: For Industrial Chemistry, Applied Electrochemistry, and Chemical Engineering Courses see the Department of Chemical Engineering.

CIVIL ENGINEERING
Office, 107 Brown Hall

PROFESSORS SHERMAN, ENO (RESEARCH), MORRIS, CODDINGTON, SLOANE, SHANK, AND PRIOR, ASSOCIATE PROFESSORS MONTZ, WALL, AND LARGE, ASSISTANT PROFESSOR MARSHALL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

602. Sanitary Engineering. Five credit hours. Autumn Quarter. Five recitations and ten hours of preparation each week. General prerequisites must include Civil Engineering 402 and 407. Mr. Prior.

Lectures and recitations upon sewerage systems, sewage, and sewage treatment.

608. Precise Surveying. Three credit hours. Autumn Quarter. One recitation and two laboratory periods each week. General prerequisites must include calculus, railroad surveying, and summer surveying camp. Mr. Coddington, Mr. Marshall.

Primary traverse, base line measurements, field triangulation, precise leveling.

609. Adjustment of Observations. Three credit hours. Winter Quarter. Three two-hour laboratory periods each week. General prerequisites must include Civil Engineering 608. Mr. Coddington, Mr. Marshall.

Theory of adjustment of observations, using work of preceding term; precise maps.

701. Concrete Design. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include a course in cement and concrete and Mechanics 602. Mr. Shank, Mr. Large.

Theory and design of elementary reinforced concrete structures.

702. Bridge Design. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include a course in stresses in structures and Mechanics 602. Mr. Morris.

A course in design of steel roofs and bridges.

703. Water Supply Engineering. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include Mechanics 605 and 610. Mr. Prior.

Construction and operation of public water supplies.

704. Masonry Construction. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include Civil Engineering 701 or 702. Mr. Wall.

Stone and ceramic products in masonry construction; foundations.

705. Masonry Structures. Five credit hours. Spring Quarter. Five recitations each week. General prerequisites must include Civil Engineering 704. Mr. Prior.

Application of principles of Civil Engineering 704 to various masonry structures.

711. Factory Building Construction. Three credit hours. Spring Quarter. Three recitations and six hours of preparation each week. General prerequisites must include Mechanics 602. Mr. Shank, Mr. Large.

Theory and design of steel frame mill buildings.

712. Trusses. Five credit hours. One Quarter. Autumn, Winter, Spring. Five recitations each week. General prerequisites must include Mechanics 602. Mr. Shank, Mr. Large.

Stresses in and design of steel-frame mill buildings.

713. Concrete Design. Five credit hours. Spring Quarter. Five recitations each week. General prerequisites must include Mechanics 602. Mr. Large.

A course for architectural engineers, similar to Civil Engineering 701.

714. Steel-Frame Buildings. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include Civil Engineering 712 or 702. Mr. Morris.

Stresses in and design of steel-frame office buildings.

732. Contracts and Specifications. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Civil Engineering 704 and a course in roads and pavements. Mr. Sherman.

Professional practice and principles underlying engineering contracts and specifications.

733. Tall Buildings. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include Civil Engineering 712. Mr. Morris.

Stresses in and design of steel-frame office buildings.

737. Advanced Bridges. Three to five credit hours. Winter Quarter. General prerequisites must include Civil Engineering 702. Mr. Morris.

Design of arches, long-span and movable bridges.

Not open to students who have credit for Civil Engineering 734 and 735.

738. Highway Plans and Surveys. Three credit hours. Autumn Quarter. One recitation and two three-hour laboratory periods each week. General prerequisites must include courses in topographic surveying and roads and pavements. Mr. Sloane.

Reconnoissance and location surveys, alignment and grades, curve widening and superelevation, bridge and culvert surveys, preparation of plans and estimates, study of highway standards.

739. Bituminous Roads and Surfaces. Three credit hours. Winter Quarter. One recitation and two three-hour laboratory periods each week. General prerequisites must include a course in roads and pavements. Mr. Sloane.

Study of various types of bituminous roads now in use, plant layout and construction details, analysis of specifications and study of current literature on maintenance, renewals and surface treatments, laboratory tests of asphalts, tars, and oils.

749. Advanced Civil Engineering. Three credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Mechanics 605 and 610, and Civil Engineering 602. Mr. Prior, Mr. Shank.

Municipal engineering, advanced concrete, advanced problems in civil engineering.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Civil Engineering. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. All instructors.

CLASSICAL LANGUAGES AND LITERATURE

Office, 217 Derby Hall

PROFESSORS HODGMAN (EMERITUS) AND BOLLING, ASSOCIATE PROFESSOR TITCHENER, ASSISTANT PROFESSOR HOUGH, MR. ABBOTT

(See page 46 for the program in Ancient History and Literature.)

GREEK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Reading and Lectures. Three to five credit hours. One Quarter. Winter and Spring. Three to five meetings each week. General prerequisites should include a course in Homer, unless permission of instructor is obtained. Mr. Bolling, Mr. Hough.

Study of the language, style, and works of some author or group of authors, chosen to meet the particular needs of the class. The course may consequently be repeated.

610. Private Reading and Minor Problems. Two to five credit hours. Autumn, Winter, and Spring Quarters. General prerequisites should include a course in elementary Greek. Mr. Bolling, Mr. Hough.

Passages for private reading and topics for investigation will be suggested to meet the needs of individual students.

660. Greek Literature in Translation. Three credit hours. Autumn Quarter. Three lectures each week. No prerequisites. Mr. Titchener.

A study of the history and development of Greek Literature, particularly the epic and drama, in English translation.

701. Principles of the Historical Study of Language. Three credit hours. Spring Quarter. Three lectures each week. Mr. Bolling.

The elements of linguistic science together with an outline of the Indo-European family of languages.

720-721-722. Historical Greek and Latin Grammar. Three credit hours each Quarter. Autumn, Winter, and Spring Quarters. General prerequisites must include ten credit hours of advanced work in the classics. Mr. Bolling.

NOTE: This course is the same as Latin 720-721-722.

LATIN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

602. Latin Satire. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Abbott.

The origin and development of satire as a literary form, with readings, principally from the Satires of Horace.

604. Lucretius. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include one course more advanced than Latin 408. Mr. Abbott.

Lectures and readings on Lucretius and Epicurus; Epicureanism as a philosophical doctrine and its place in the history of Roman philosophy; reading of De Rerum Natura.

612. Latin Prose Composition: First Course. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include five Quarters of college Latin. Mr. Abbott.

Exercises and lectures on Latin idiom and style.

613. Latin Prose Composition: Second Course. One credit hour. Autumn, Winter, Spring. One recitation each week. General prerequisites must include Latin 612. Mr. Abbott.

A continuation of Latin 612. Students are expected to take this course in three consecutive Quarters. Not more than three hours credit.

615. Proseminary I. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include six Quarters of college Latin. Mr. Titchener, Mr. Abbott, Mr. Hough.

Lectures on topics suggested by the study of Caesar and Cicero; readings from the Letters of Cicero. Latin 615 is designed especially for students preparing to teach Latin.

616. Proseminary II. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include six Quarters of college Latin. Mr. Titchener, Mr. Abbott.

Lectures on the life and works of Vergil, and his influence on modern literature; readings from the Eclogues and the Georgics. Latin 616 is designed especially for students preparing to teach Latin.

627. Vulgar Latin. Three credit hours. Winter Quarter. General prerequisites must include six Quarters of college Latin, or French 801, or the consent of the instructor must be obtained. Mr. Abbott.

Lectures and the study of texts and inscriptions illustrating the development of the popular speech.

629. History of Literary Tradition. Three credit hours. Spring Quarter. Mr. Abbott.

Lectures and discussions dealing with the genesis and development of literary forms and motifs and their tradition down to the rise of modern literatures. The course will be so conducted that students of literature generally will be welcome.

631. Private Reading and Minor Problems. Two to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Titchener, Mr. Hough.

Passages for private reading and topics for investigation will be suggested to meet the needs of individual students.

635-636-637. Advanced Translation or Technical Courses. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include six Quarters of college Latin. Mr. Titchener, Mr. Hough, Mr. Abbott.

Selections will be made in accordance with the needs of the students from such types of literature as comedy, tragedy, epic, elegy, novel, history, political and oratorical writings, or such technical courses as paleography and epigraphy.

650-651-652. History of Roman Literature. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include three reading courses more advanced than Latin comedy. The content of the readings within this course is so extensive that graduate students may repeat this course for credit. Mr. Titchener, Mr. Hough.

Lectures and assigned reading in literary histories on the development of Roman literature; required and suggested passages for translation in each author studied; brief weekly reports.

720-721-722. Historical Greek and Latin Grammar. Three credit hours each Quarter. Autumn, Winter, and Spring Quarters. General prerequisites must include ten hours of advanced work in the classics. Mr. Bolling.

NOTE: This course is the same as Greek 720-721-722.

NOTE: TEACHING COURSE. For the Teaching Course in this department see the Department of Education, Course 694.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Candidates for advanced degrees will be required to have:

(a) Some knowledge of language as such and of the place held in the history of linguistic development by the Classical Languages. To attain this end, all candidates must have at least one course in General Linguistics (Greek 701).

(b) A knowledge of Classical Literature in its broad outlines.

(c) An understanding, in a general way, of the principles of textual criticism, and as a means to this end, some knowledge of Paleography.

Candidates for the Doctorate will be required to attain such mastery of their major language as will enable them to express themselves in it and to interpret any document in that language set before them. Similar but less difficult tests will be applied to candidates for the Master's degree; the passages set before them for interpretation will be selected from some particular field in which they have already worked.

Candidates for the Doctorate who make one of the Classical Languages their major, must take in the other language one course, at least, from the intermediate group (600).

800. Seminary. Three credit hours. Autumn, Winter, and Spring Quarters. Mr. Titchener.

Textual criticism and research problems. The author to be studied will be assigned by the instructor.

950. Research in Classical Languages. Autumn, Winter, and Spring Quarters. The staff.

COMPARATIVE LITERATURE AND LANGUAGE

Courses formerly offered under the above heading will be found under the Departments of Classical Languages and Literature, and German.

DAIRY TECHNOLOGY

Office, 111 Townshend Hall

PROFESSOR STOLTZ, ASSOCIATE PROFESSOR BURGWALD, ASSISTANT PROFESSOR ERB

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 86.

605. Management of Dairy Plants. Three credit hours. Winter Quarter. Three discussion periods each week. General prerequisites must include Dairy Technology 607, 608, and 610. Mr. Stoltz.

Lectures will be given on the organization, construction, and operation of milk plants, creameries, cheese factories, condenseries, and ice cream plants. The purchasing of milk and milk products by various methods, the importance of sanitation, employing of help, and the purchasing of supplies will be discussed. A trip to visit small and large plants is required.

607. Market Milk. Five credit hours. Autumn Quarter. Three discussion periods and one two-hour and one four-hour laboratory periods each week. General prerequisites must include Bacteriology 607, 610, 611, and Agricultural Chemistry 605. Mr. Burgwald.

Lectures and assigned readings will be given on the handling and distribution of milk for city trade including cooling, clarifying, standardizing, pasteurizing, and bottling milk and cream and methods of determining the bacterial and leucocyte count in milk in order to comply with the regulations laid down by the various city ordinances. Laboratory will consist of practical work in handling and processing milk and the operation of the milk plant. Training and practice will be given in milk inspection from the standpoint of the Board of Health and the city milk plant.

Not open to students who have credit for Dairying 404.

608. Hard Cheese Manufacturing. Five credit hours. Winter Quarter. Two discussion periods and two four-hour laboratory periods each week. General prerequisites must include Bacteriology 607, 610, and 611. Mr. Burgwald.

Lectures will take up the methods of manufacturing cheddar, Swiss, brick, and Limburger cheese, the method of paying for milk at cooperative cheese factories and the scoring of American cheese. Laboratory work will consist of the making of cheddar cheese from both raw and pasteurized milk, Swiss cheese by the use of the eye-forming culture, brick, Limburger, and farm cheese.

Not open to students who have credit for Dairying 408.

609. Condensed Milk and Milk Powders. Three credit hours. Autumn Quarter. Two discussion periods and one three-hour laboratory period each week. General prerequisites must include Agricultural Chemistry 605 and a course in bacteriology. Mr. Erb.

Lectures will be given on the theory and practice of milk condensation and milk drying. Special emphasis will be given to the questions of heat stability of milk, the salt balance, and lactose crystallization. Laboratory work will consist of practical work in the operation of vacuum pans, sterilization of milk, and visits to milk condenseries and powder plants in the vicinity of Columbus.

Not open to students who have credit for Dairying 409.

610. Ice Cream Manufacturing. Five credit hours. Autumn Quarter. Three discussion periods and two three-hour laboratory periods each week. General prerequisites must include Agricultural Chemistry 605 and a course in bacteriology. Dairy Technology 609 should be taken concurrently. Mr. Erb.

The course deals with the modern ice cream industry and has to do with manufacturing operations, distribution methods and sales activities. Considerable attention is given to the physico-chemical aspects of ice cream and how these enter into modern processing procedure. Laboratory work consists of processing ice cream and visiting manufacturing plants.

615. Dairy Products Scoring. Three credit hours. Spring Quarter. One lecture and two two-hour laboratory periods each week. Mr. Burgwald.

An advanced class for Juniors who are majoring in dairy technology and who desire to take up judging of milk, butter, ice cream, and cheese in the commercial field.

701. Special Problems. Three to fifteen credit hours, taken in units of three to five hours each Quarter, for one or more Quarters. Autumn, Winter, Spring. Mr. Stoltz, Mr. Burgwald, Mr. Erb.

This course is designed for students majoring in Dairy Technology and consists in working out special problems along the lines in which they are specializing.

702. Dairy Seminary. One credit hour. Autumn, Winter, and Spring Quarters. One hour conference each week. Open to Seniors and graduate students who are specializing in dairy technology and to those who have permission of the instructor. During this seminary seniors will report on problems or special references. Graduate students will make a report of their problems. Instructors in allied departments of the University will be requested to take part in this seminary.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Dairy Technology. Autumn, Winter, and Spring Quarters. One hour conference each week. General prerequisites must include at least twenty hours of work in the department, and the consent of the instructor must be obtained. Mr. Stoltz, Mr. Burgwald, Mr. Erb.

Research work in Dairy Technology is conducted under the supervision of Mr. Stoltz, Mr. Burgwald, and Mr. Erb. Any apparatus or equipment on hand will be furnished and room will be arranged for those desirous of studying problems pertaining to market milk, ice cream, butter, cheese, evaporated milk, milk powder, buttermilk, or other dairy products. Students desiring to work on some problems, such as plant management, dairy bacteriology, dairy chemistry, nutrition, cost accounting, can arrange to carry on the work as though it were in one department and college.

DRAWING

(See Engineering Drawing)

ECONOMICS

Office, 116 Commerce Building

PROFESSORS WOLFE, HAYES, WALRADT, DICE, HELD, AND KIBLER, ASSOCIATE PROFESSORS ZORBAUGH, SMART, BOWERS, AND JAMES, ASSISTANT PROFESSORS PATTON, WILLIT, HERBST, BITTERMANN, DONALDSON, AND ROWNTREE, MR. BOTTE, MR. CAPLAN, MR. FREEMAN, MR. HARRISON, MR. SHAFFER, MR. STEVENS, MR. SUFRIN, MR. WELSH, MR. WHITSETT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601-602-603. Principles of Economics; Advanced Course. Three credit hours. Autumn, Winter, and Spring Quarters. Three class meetings each week. General prerequisites must include Economics 401-402, and at least ten additional hours in Economics and senior standing. Limited enrollment. Mr. James.

This course is designed to provide a more thorough and critical consideration of economic principles than is possible in the elementary courses. It attempts to arrive at some understanding of the more fundamental principles involved in the present changing economic system.

604-605. Current Economic Problems. Three credit hours. Two Quarters. 604, Autumn Quarter; 605, Winter Quarter. Three class meetings each week. General prerequisites must include Economics 401-402. Mr. Hayes.

A lecture and discussion course providing a survey and analysis of some of the leading current economic issues, especially those connected with the economic functions of the Federal administration, agricultural adjustment, development of natural resources, provision for the aged and unemployed, tariff adjustment, and industrial self-government.

613. Money and Banking: Problems and Policies. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include Economics 520 or the consent of the instructor must be obtained. Mr. Willit.

The work of this course includes a brief survey of banking in the United States, Canada, and England. An analysis of the recent changes in our monetary and banking system and a study of the functions of the Federal Reserve System and its place in financial planning and control.

616. Corporation Economics. Five credit hours. Autumn Quarter. Five meetings each week. Mr. Donaldson.

A course in corporation organization and finance designed primarily for students outside of the College of Commerce and Administration.

Not open to students who have credit for or who are taking Business Organization 650.

618. Transportation Economics. Five credit hours. One Quarter, Autumn, Winter, Spring. Five class meetings each week. Mr. Kibler, Mr. Rowntree, Mr. Whitsett.

A general survey of the history and regulation of inland transportation agencies, and a discussion of current problems of transportation and regulation, for students with a general interest in the field of economics as well as for those with a special interest in transportation.

624. Principles of Insurance. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. E. L. Bowers.

A study of the theory and practice of the principal types of insurance in the life, fire, and casualty fields. The economic theory of risk; loss prevention; state supervision, etc.

Not open to students who have credit for Business Organization 760.

625-626. Analysis and Control of Business Cycles. Two credit hours. Winter and Spring Quarters. Mr. Hayes.

A general survey of changes in price levels and production. Past and current theories of business cycles. Proposed plans for the control of economic fluctuations.

631-632-633. Public Finance. Three credit hours. Autumn, Winter, and Spring Quarters. Three class meetings each week. Mr. Walradt.

A study of the problems connected with the debts, expenditures, revenues, and fiscal administration of national, state, and municipal governments.

634-635. International Economic Problems. Three credit hours. Autumn and Winter Quarters. Three class meetings each week. Mr. James.

Theories of international trade and finance. Balance of international payments for important countries: war debts, export of capital, gold movements, etc. Broader aspects of international economic relations emphasized.

637. Labor Relations. Five credit hours. Autumn Quarter. Five class meetings each week. Miss Herbst.

A study of the methods used by wage-earners, employers and the government to meet present-day labor conditions.

638. Labor Legislation. Three credit hours. Winter Quarter. Three class meetings each week. Miss Herbst.

A study of society's efforts through legislation to improve the conditions of labor and to increase its bargaining power. Legislation and court decisions affecting the labor of men, women, and children, hours, wages, working conditions, immigration, convict labor, trade union activities and industrial disputes.

639. Social Insurance. Three credit hours. Spring Quarter. Three class meetings each week. Mr. E. L. Bowers.

Efforts to guarantee to the worker security. Accident insurance; employers' and workmen's compensation; health hazards and health insurance. Old age insurance and pensions; unemployment and its prevention; unemployment insurance. Compulsory automobile insurance.

643. Woman in the Modern Economic World. Four credit hours. Autumn Quarter. Four class meetings each week. Given in alternate years. Miss Herbst.

A study of the relation of women to the present economic order, and of the social, economic, industrial and legal problems associated therewith.

645. Principles of Economic Consumption. Three credit hours. Winter Quarter. Three class meetings each week. Miss Zorbaugh.

Critique of consumption facts and problems, and of consumers' welfare. Theories of consumers' economic role. Some existing and proposed means—private and public—of controlling consumption.

See Survey 664, on page 195.

648. Public Utility Economics. Five credit hours. Autumn Quarter. Five class meetings each week. Mr. Kibler.

A course complementary to Economics 618, with special emphasis on local public utilities, including water, gas, electric light and power, telephone and telegraph, etc. The history and present status of regulation and the leading problems arising therefrom, including supervision of holding companies, valuation, reasonableness of rates, adequacy and economy of service, etc. Public ownership versus public regulation.

651. International Commercial Policies. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Held.

The theory of international trade; historic policies; mercantilism; free trade and protection. A study of the tariff policy of the United States with a comparative study of the policies of other countries. International trade as affected by the World War.

656. The Distribution of Wealth and Income. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hayes.

Analyses of the process by which wages, interest, rent, and profit are determined; proposals for altering same.

***658-*659. Population.** Three credit hours. Autumn and Winter Quarters. Three class meetings each week. Mr. Wolfe.

The growth and distribution of population. The relation of numbers to resources, productive capacity, standard of living, prosperity, and international economic problems. The dynamic aspects of population in relation to material and moral progress. Critical consideration of population theories and policies.

668. Capitalism and Socialism in Present-Day Europe. Three credit hours. Spring Quarter. Prerequisite, Economics 669 and 670. Mr. Hayes.

Revolutionary and reform movements in Europe with special attention to Russia, Germany, and Italy.

Not open to students who have credit for Economics 869.

* Not given in 1936-1937.

669. The History of Movements of Economic Reform. Three credit hours. Autumn Quarter. Three class meetings each week. Prerequisite, Economics 401-402. Mr. Hayes.

Historical survey of movements for economic reform including Utopian and Marxian socialism, anarchism, fascism, and communism.

Not open to students who have credit for Economics 657 or 667.

670. Theories of Economic Reform. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Economics 669. Mr. Hayes.

The idealistic theories of Utopian socialism; the economic philosophy of anarchism, communism, and fascism, and revisionism versus revolution; Marxian and neo-Marxian theory.

700-701-702. Reading Course. One to five credit hours. Autumn, Winter, and Spring Quarters. Open by permission of the chairman of the department. All instructors.

(a) A program of reading arranged for the undergraduate student, with individual conferences and reports. Prerequisite: (1) Senior standing; (2) the record of "A" in at least half of his Economics courses and an average of "B" in the remainder; (3) permission of the professor under whose supervision the work is given. Candidates for a degree with distinction in Economics must enroll for this course for at least two Quarters. Mr. Hayes, with the cooperation of other members of the department.

(b) A program of reading open to graduate students in lieu of scheduled courses, or supplementary to study provided in regular courses.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites must include good foundation courses of collegiate grade in the principles of economics, political science, psychology, European and American history.

MASTER'S DEGREE: The candidate for the Master's degree in economics must meet certain minimum requirements: (1) in the general principles of economics; (2) in the history of economic thought and processes, for which Economics 801-802-803 or its equivalent is necessary; (3) in elementary statistics, which, if it has not been taken as an undergraduate course, may be obtained by taking Economics 807.

DOCTOR'S DEGREE: The candidate for the Doctor's degree in economics should have a broad and liberal training, such as will enable him to approach his work in a scientific, critical, and constructive spirit; and from a broad social point of view rather than from that of a narrow special interest. In order to attain this point of view, he should have gained familiarity with the progress which has been made not only in economics but in the other social sciences, as well as in philosophy and psychology. A reasonable acquaintance with European and American history is presupposed.

The more specific requirements for the Doctor's degree in economics include the following:

(1) The minimum requirements for the Master's degree as given above;
(2) Modern economic theory at least equivalent to Economics 816-817-818;
(3) Concentration in one of the following fields, and extensive preparation in at least five of the others;
  (a) Economic theory;
  (b) Economic history, European and American;
  (c) Statistics;
  (d) Labor problems and legislation;
  (e) Socialism and economic reform;
  (f) Money and banking;
  (g) Business cycles and economic planning;
  (h) Public finance;
  (i) International economic relations;
  (j) Corporations and public control, transportation and public utilities;
  (k) Population and standard of living;
  (l) Marketing;
(4) One or more subjects taken in other departments of the university, selected with the approval of the professor in charge of the candidate's dissertation.

801-802-803. History of Economic Thought. Three credit hours. Autumn, Winter, and Spring Quarters. Three class meetings each week. Mr. Patton.

An account of the development of economic ideas and principles in the Western World with the purpose of showing how they were the outgrowth of the economic and political conditions of the times in which they originated.

804-805-806. **Economic History of the United States.** Three credit hours. Autumn, Winter, and Spring Quarters. Three class meetings each week. Given in alternate years; alternates with Economics 812-813-814. Mr. Smart.

Not open to students who have credit for Economics 661-662-663.

807-808-809. **Statistical Analysis.** Two credit hours. Autumn, Winter, and Spring Quarters. One two-hour class meeting each week. General prerequisites must include the basic course in mathematics and permission of the instructor. Mr. Smart.

A general course in statistical methods designed primarily to give the graduate student in economics, who intends to enter into the statistical field, a clear conception of the value of statistics to economics and business. The course will include a treatment of the methods of collection, tabulation and graphic representation of data, of analysis of statistical series of various kinds together with an interpretation of the final results.

*812-*813-*814. **The Economic History of Western Europe.** Two credit hours. Autumn, Winter, and Spring Quarters. Two class meetings each week. Preferably preceded or accompanied by Economics 801-802-803. Given in alternate years; alternates with Economics 804-805-806. Mr. Smart.

A general survey from the fall of the Roman Empire to the Great War. Especial attention is given to the interrelations between the economic institutions, the general culture, and the economic thought of the various periods. The development of modern capitalism. Economic background and social consequences of the Industrial Revolution. The economic causes and implications of modern European nationalism.

*815. **Costs and Returns.** Three credit hours. Spring Quarter. Three class meetings each week. Mr. Rowntree.

Critical and constructive analysis of the conditions which determine costs of production. Types of cost. Differences and changes in costs. The intricacies of the relation of cost to value. Critical consideration of the history of the theory of costs and returns.

*816-*817-*818. **Modern Economic Theories and Theorists.** Three credit hours. Autumn, Winter, and Spring Quarters. Three class meetings each week. Given in alternate years; alternates with Economics 871-872-873. Mr. Wolfe.

Critical consideration of the leading economists from J. S. Mill to the present. English and American classical and neo-classical writings, the Austrian School, and the more important continental theorists, including post-war and contemporary writers, both orthodox and unorthodox. The order of treatment is chronological in the main.

825. **Current Taxation Problems.** Two credit hours. Winter Quarter. Mr. Walradt.

A critical analysis of the taxation problems now before the federal, state, and local governments.

826-827. **Stability of Capitalism.** Two credit hours. Winter and Spring Quarters. One two-hour class meeting each week. Mr. Salz.

Adaptability versus rigidity in the capitalistic system. Functions of these characteristics in relation to the elasticity of an economic system. The capitalistic system viewed from the standpoint of mechanical and biological analogies. The variable elements in the capitalistic system in relation to stability and instability of the system as a whole. The bearing of the organization of the monetary system and the distribution of wealth and income. Comparison of capitalism, with respect to stability and instability, with other types of economic organization, historical and contemporary. The course will view the problem of capitalism broadly, not only from the strictly economic, but from the political, historical, and sociological points of view.

842. **Income.** Three credit hours. Spring Quarter. Mr. Hayes.

A survey of income studies in the United States as to their methods and results. The distribution of income. The utilization of income. The relation of national wealth and debt to income. Effect of changing price levels on national income.

863. **Advanced Money.** Three credit hours. Autumn Quarter. Preferably preceded by a course in Money and Banking. Mr. Dice.

A study of the gold standard; the gold exchange standard; the role of money in the economic organization; the leading types of monetary theory; and the methods of stabilizing the price level.

Not open to students who have credit for Economics 611.

* Not given in 1936-1937.

864. Advanced Banking. Three credit hours. Winter Quarter. Three discussion periods each week. General prerequisites must include a course in money and banking. Mr. Dice.

The integration of the financial institutions; the theories of bank deposits; the theories of the elasticity of bank currency; the discount policy and the interest rate of central banks; the effectiveness of the different methods of regulating credit and business activities.

Not open to students who have credit for Economics 612.

865-866-867. Public Control of Industry. Two credit hours. Autumn, Winter, and Spring Quarters. Mr. Kibler.

A study of the underlying conceptions and conditions of control, the general instruments of control, and the safeguarding of consumers against exploitation. Attention is directed to the legal and constitutional background of control. Examination of various proposals for economic planning.

868. Problems of Capital Accumulation and Utilization. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Wolfe.

An analysis of the doctrines of economists and other writers concerning the problems of capital accumulation and utilization with especial attention to economic "progress," oversaving, thrift, industrial depressions, inequality of wealth, and the export of capital.

870. European Banking Systems. Two credit hours. Autumn Quarter. Mr. Willit.

A survey of the central banking and commercial banking systems of the leading European countries, together with a study of the current international banking and credit problems.

871-872-873. Problems in Modern Economic Theory. Three credit hours. Autumn, Winter, and Spring Quarters. To be given in alternate years with Economics 816-817-818. Mr. Wolfe.

An examination of the development of the main problems and lines of thought in modern theory. This course covers much the same ground as Economics 816-817-818, but from a developmental rather than chronological point of view. Emphasis is on theories rather than on individual writers or schools.

874. Labor and Industry. Two credit hours. Spring Quarter. Mr. Bowers.

A seminar course on present-day problems confronting the wage-earner. The problems will be considered with special reference to the Trade Union Movement in this and other countries.

877. Social Insurance Problems. Two credit hours. Winter Quarter. Mr. Bowers.

A critical analysis of social insurance problems faced by the Federal and State governments; the place of social insurance in the economic system, with special reference to its preventive aspects and stabilizing possibilities; economic aspects of administration.

879. Mathematical Economic Theory. Two credit hours. Autumn Quarter. Mr. Bittermann.

Analysis of problems in price and distribution theory requiring mathematics for their solution. Development of mathematical economics.

880-881-882. Institutional Economics. Two credit hours. Autumn, Winter, and Spring Quarters. Offered in alternate years. Mr. Wolfe.

Critical analysis of the development and content of "institutionalism," with special emphasis on Veblen and Commons. A thorough study of Commons' "Institutional Economics," and consideration of its implications for future theory and practice in political economy.

883-884. Continental Economists. Two credit hours. Autumn and Winter Quarters. Mr. Bittermann.

The work of outstanding continental economists of the nineteenth and twentieth centuries with special attention to the current status and trend of European economic thought.

A reading knowledge of German, French, and Italian is advantageous.

950. Research in Economics. Autumn, Winter, and Spring Quarters. Open by permission of the Chairman of the Department.

Qualified graduate students who wish to do research with the advice of members of the staff of the Department of Economics may register for this course.

EDUCATION

Office, 116 Education Building

EXECUTIVE COMMITTEE: PROFESSORS EIKENBERRY AND ALBERTY, ASSOCIATE PROFESSOR DAVIS

PROFESSORS ALBERTY, BERRY, BODE, BRIM, CLIFTON, DAVIS, EIKENBERRY, GOOD, HECK, HULLFISH, KLEIN, LEWIS, PAHLOW, REEDER, SAYERS, SEELY, STONE, TWISS (EMERITUS), AND ZIRBES, ASSOCIATE PROFESSORS BENNETT, CAHOON, ECKELBERRY, LANDSITTEL, SMITH, THARP, AND WARNER, ASSISTANT PROFESSOR BRONSKY, MR. EBERHART, MR. SHOEMAKER

Prerequisites for Entrance Upon Graduate Work in Education

1. A student seeking to enter upon graduate work in the field of education shall hold a Bachelor's degree from an accredited institution of higher learning and shall show familiarity with certain fields of education to the extent of what is ordinarily covered in undergraduate courses in approximately twenty-four Quarter hours. The fields in which familiarity should be exhibited include the following: (a) Philosophy of Education, (b) Educational Psychology, (c) Principles of Teaching, (d) History of Education, and (e) School Organization and Management. In demonstrating competency in such fields the student may either present official records or take a comprehensive examination.

In addition to the above requirement the student will present course credits for student teaching or provide evidence of one or more years of successful teaching experience.

2. Specific requirements to supplement the foregoing general prerequisites may be set up in the various areas of specialization. An illustration follows:

A student preparing to secure a Master's degree in the teaching of high school English, before admission to graduate work, shall meet the foregoing professional prerequisites and in addition shall show competency, either by course credits or comprehensive examination, in English equivalent to the requirement of the College of Education for graduation.

Prerequisites for 600 and 800 Courses

1. **600 courses for undergraduate and graduate credit.** Junior standing and twenty Quarter-credit hours in education and allied subjects of which ten approved by the instructor must be in education.

2. **600 courses for graduate credit only.** Graduate standing in the field of education.

3. **800 courses.** Graduate standing in the field of education and ten Quarter-credit hours in graduate courses in education approved by the instructor.

NOTE: Courses in the Department of Education are arranged under the following headings:

General and Basic, Philosophy of Education, History of Education and Comparative Education, Elementary Education, Secondary Education, Higher Education and Teacher Training, Industrial Education, Commercial Education, Superintendency, Guidance, Special and Adult Education.

All of these except the first represent areas of specialization within the Department of Education.

Courses listed in the Department of Education include those previously offered by the Departments of Adult Education, History of Education, Practical Arts and Vocational Education, Principles and Practice of Education, and School Administration.

KEY TO COURSE NUMBERS

General and Basic	600-609	802-806
Philosophy of Education	610-629	807-811
History of Education and Comparative Education	630-649	812-820
Elementary Education	650-669	821-828
Secondary Education	670-710	829-844
Higher Education and Teacher Training		845-855
Industrial Education	712-714	856-857
Commercial Education	715-724	860-866
Superintendency	727-744	867-883
Guidance	745-763	884-896
Special and Adult Education	764-770	897-899
Research		950

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

GENERAL AND BASIC

600. Minor Problems. Two to four credit hours. Autumn, Winter, and Spring Quarters. Students may, with the approval of their advisers, register for more than one section of Education 600 or for the same section two or more times.

By permission of the Executive Committee of the Department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under members of the Bureau staff.

(a) Commercial Education. Mr. Stone.
(b) Elementary Education. Mr. Brim, Miss Zirbes, Mr. Lindquist, Mr. Warner, Mr. Heck, Miss Bronsky.
(c) Guidance. Mr. Stone, Mr. Clifton, Mr. Anderson, Mr. Heck, Mr. Smith, Mr. Love.
(d) History of Education. Mr. Good, Mr. Eckelberry, Mr. Shoemaker.
(e) Industrial Arts Education. Mr. Warner, Mr. Smith.
(f) Secondary Education. Mr. Alberty, Mr. Eikenberry, Mr. Lindquist, Mr. Davis, Mr. Landsittel, Mr. Eckelberry.
(g) Special and Adult Education. Mr. Berry, Mr. Heck.
(h) Vocational Industrial Education. Mr. Stone, Mr. Warner, Mr. Smith.
(i) Teaching of English. Mr. Seely, Mr. Eberhart.
(j) Teaching of Social Studies. Mr. Pahlow, Mr. Landsittel.
(k) Teaching of Foreign Languages. Mr. Tharp.
(l) Teaching of Biology, Physics, Chemistry, or General Science. Mr. D. F. Miller.
(m) Teaching of Mathematics.
(n) Philosophy of Education. Mr. Bode, Mr. Hullfish.
(o) Superintendency. Mr. Lewis, Mr. Reeder, Mr. Davis, Mr. Clifton, Mr. Heck, Mr. Holy, Mr. Bennett.

603. Foundations of Education I. Three credit hours. One Quarter. Autumn and Spring. This course or equivalent preparation required of all candidates for advanced degrees in the field of education. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Bode, Mr. Stone, Mr. Hullfish.

This course introduces materials which in their extension through the succeeding units of this sequence appear appropriate for the foundations required of all graduate students in Education. In general, these materials consist of a survey of major social philosophies, their biological, psychological, and historical sources, and their application in the continuous reorganization of educational agencies and procedures, including research.

604. Foundations of Education II. Four credit hours. Winter Quarter. This course or equivalent preparation required of all candidates for advanced degrees in the field of education. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Good.

Continuation of Education 603.

605. Foundations of Education III. Three credit hours. One Quarter. Autumn and Spring. This course or equivalent preparation required of all candidates for advanced degrees in the field of education. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Lewis, Mr. Stone.

Continuation of Education 604.

PHILOSOPHY OF EDUCATION

610. Conceptions of Mind in Educational Theory. Three credit hours. Spring Quarter. Mr. Bode.

A study of the doctrines of mind that have exercised a determining influence upon educational theory and practice.

Not open to students who have credit for Principles of Education 354 or 620.

611. The Thinking Process in Its Educational Bearings. Three credit hours. Winter Quarter. Mr. Hullfish.

A study of the thinking process for the purpose of tracing its implications for educational theory and classroom practice.

Not open to students with credit for Principles of Education 683.

617. Modern Tendencies in Education. Three credit hours. Spring Quarter. Mr. Bode, Mr. Brim, Mr. Alberty, Mr. Hullfish.

A discussion of current educational doctrines and controversies, in the light of their historic background and their philosophical implications.

Not open to students who have credit for Principles of Education 356 or 640.

620. Moral Ideals in Education. Three credit hours. Spring Quarter. Mr. Hullfish.

A consideration of types of moral ideals, of the relation of moral values to school subjects, and of the question of direct and systematic moral instruction in the schools.

Not open to students who have credit for Principles of Education 350 or 601.

624. Social Education. Three credit hours. Spring Quarter. Lectures and discussions. Mr. Cook.

An examination of educational agencies and processes other than those of the school, which contribute to the enlightenment and socialization of the individual. An analysis of childhood's isolation, the methods of communication and control, the influence of the family, the playgrounds, the industrial organization, the church and the state.

Not open to students who have credit for Principles of Education 645.

HISTORY OF EDUCATION AND COMPARATIVE EDUCATION

632. The History of Modern Education. Five credit hours. One Quarter. Autumn, Winter, Spring. Required in the College of Education except for students preparing for service in elementary schools. Mr. Good, Mr. Eckelberry, Mr. Shoemaker.

Not open to students who have credit for History of Education 401, 404, 405, 625, 626, 627, or Education 507 or 631.

633-634. Historical and Comparative Study of Secondary Education. 633, Autumn Quarter, two credit hours; 634, Winter Quarter, three credit hours. General prerequisites for 633 must include twenty hours in education and allied subjects including ten hours in secondary education and five hours in history of education; for 634, Education 633. Mr. Eckelberry.

A survey of the development of secondary education with intensive treatment of the American academy and high school in relation to social and political conditions and philosophies, and in comparison with present secondary schools in Europe.

Not open to students who have credit for Education 637, of which these two courses constitute the equivalent. It is recommended that students do not register for Education 633, unless they expect to register also for Education 634.

635. The Evolution of Educational Thought. Five credit hours. Spring Quarter. Given in alternate years. Mr. Good.

A study from the sources of the great philosophies of education in relation to their times; and an evaluation of their influence on present educational thought and practice. The thought of the Greek, Roman, Renaissance, and the modern democratic and industrial thinkers will be studied.

Not open to students who have credit for History of Education 350, 351, 352, 353, 601, or 602.

639. Great Teachers. Two credit hours. Spring Quarter. One two-hour lecture each week. Mr. Good.

Study of the times, personalities, and work of several eminent teachers: Socrates, Plato, Jesus, Quintilian, Agassiz, Arnold and others.

Not open to students who have credit for History of Education 617.

641. The History of Vocational Education. Three credit hours. Spring Quarter. One two-hour meeting each week. Given in alternate years. Mr. Good, Mrs. Pressey, Mr. Stewart, Mr. Stone.

The history of activities related to agriculture, commerce, industry, and home making as a part of education, and their relation to the general theory and practice of education.

Not open to students who have credit for Agricultural Education 602 or History of Education 607.

*642. **History of Physical and Health Education.** Three credit hours. Spring Quarter. Given in alternate years. Mr. Shoemaker.

An historical survey of physical and health education beginning with the physical education of ancient Greece, with special emphasis on recent and contemporary developments in Europe and America.

Not open to students who have credit for Physical Education 681 or 683.

ELEMENTARY EDUCATION

*650. **Fundamentals in Childhood Education.** Three credit hours. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Lindquist.

A service course for graduate students whose fields of specialization are in educational divisions other than elementary education. A general survey of major problems and issues in early and later childhood education with particular reference to the function of the school in the period between infancy and adolescence.

651. **Major Sequence in Childhood Education.** Three credit hours. Autumn Quarter. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Brim.

A comprehensive survey of the educational needs of children between infancy and adolescence, with particular reference to the adjustment of learning experiences, materials, and procedures to successive levels of child development.

652. **Major Sequence in Childhood Education (Continued).** Three credit hours. Spring Quarter. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Brim.

A critical study of the changing elementary school, the social and psychological implications of current issues involved in reconstruction in transition in elementary education.

†653. **Laboratory Study in Elementary Education.** Three credit hours. In additional to the general prerequisites, graduate standing in the field of education is required. Miss Zirbes and Demonstration School Staff.

A graduate course in which elementary school principals, supervisors, superintendents and others interested in leadership in elementary education will study the demonstration school in action with the advantage of planned guidance and interpretation, contacts, and conferences with the staff. In addition to the general problems of the course, there will be opportunities for students to select individual topics for special study, and to consider the bearings of education transition on their own work in the field.

658. **Problems in the Direction and Supervision of Elementary Teacher Training.** Three credit hours. Autumn Quarter. In addition to the general prerequisites, graduate standing in the field of education or maturity and experience satisfactory to the instructor are required. Mr. Brim.

An intensive study of the problems confronting the director of training, the supervisors of student teachers and critic teachers. Special attention is given to the development of the teacher as a person, enriched content courses, reorganization of methods courses, more intimate relation of theory and practice, widening the scope of practice teaching, and creative supervision of student teaching.

Not open to students who have credit for Principles of Education 616.

661. **Problems of Elementary Teachers in Service.** Two credit hours. Winter Quarter. Participation in special projects and investigations with reports. Open by permission of the instructor to principals and teachers in service. Miss Zirbes.

The work will center about ways and means of improving instruction through actual attack on selected classroom problems.

664. **Health Education for Teachers.** Three credit hours. Spring Quarter. Three lecture periods each week. General prerequisites must include Education 501. Mr. Oberteuffer.

A consideration of the teacher's responsibility for practicing and maintaining high standards of personal hygiene and health, and a first-hand study of the environmental and social conditions and problems of community health.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

SECONDARY EDUCATION

670. Teaching Literature in the High School. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lectures each week: observations. Mr. Seely.

Emphasis will fall upon the selection of suitable poetry, drama, prose-fiction, etc., for junior and senior high-school pupils; developing methods for their presentation and study; and suggesting means for correlating the work in literature with the other high-school studies.

Not open to students who have credit for Principles of Education 340, 341, or 662.

671. Teaching Composition in High School. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lectures each week: observations. Mr. Seely.

This course will be devoted to the discussion of the methods of teaching grammar and composition, and to means of developing originality, imagination, and individuality in the oral and written expression of high-school pupils.

Not open to students who have credit for Principles of Education 343 or 714.

***672. Teaching Composition in High School.** Three credit hours. Lectures, conferences, readings. This course is the more advanced part of Education 671 (offered during the year). It may be elected by teachers and other persons of maturity who are not required to elect all of Education 671. (Students who will do practice teaching in English may not elect this course since they will elect Education 671 during the Autumn or Spring Quarter.) Mr. Seely.

This course will be devoted to the materials and methods of teaching the language fundamentals, oral composition, and written composition.

Not open to students who have credit for Principles of Education 714, 343, or Education 671.

†675. Spoken English: Teachers' Course. Three credit hours. Prerequisite or concurrent, Education 533. Mr. Wiley.

Classroom lectures and discussion designed to assist teachers of public speaking and debating in secondary schools. The nature of speech training in the secondary schools. Definite suggestions on the following: how to prepare students for debating and speaking contests; speech delivery; speech composition; classroom reports. This is not a course in speech practice.

Not open to students who have credit for Public Speaking 680 or Principles of Education 760.

677. Organizing History for the Classroom. Five credit hours. One Quarter. Autumn and Spring. Five lectures each week: observations. Education 533 must be included in the general prerequisites or taken concurrently. Mr. Pahlow.

A professionalized subject-matter course surveying the field of high school history as a whole and organizing it into smaller units for teaching purposes.

Not open to students who have credit for Principles of Education 384, 385, or 663.

678. The Teaching of the Social Studies. Five credit hours. One Quarter. Autumn and Spring. Five lectures each week; observations. General prerequisites must include six Quarters of social studies, two of which must be in history, and two in other social studies. Education 533 must be included in the general prerequisites or taken concurrently.

This course deals with the history of the teaching of history and the other social studies: aims and methods; classroom and library equipment; evaluation of textbooks; testing.

Not open to students who have credit for Principles of Education 665 or 700.

683. The Teaching of Biology. Three credit hours. Spring Quarter. Three recitations each week: observations. General prerequisites must include elementary courses in botany and zoology, and at least two additional Quarters

* Not given in 1936-1937.
† Not given during the academic year, 1936-1937.

of some biological subject. Education 533 must be included in the general prerequisites or must be taken concurrently. Mr. Tiffany, Mr. D. F. Miller.

The work will include lectures and demonstrations with discussion of the best methods of presenting botany, zoology, and biology to high school students.

Not open to students who have credit for Principles of Education 705.

684. The Teaching of Chemistry and Physics. Three credit hours. Spring Quarter. Three lectures each week: observations.

A study of the problems of instruction that confront the teachers of chemistry and physics in modern high schools, such as objectives, educational values and methods of chemistry and physics teaching, selection and organization of subject matter, choice and use of textbooks, apparatus, recitations, lectures, excursions, class and laboratory experiments, problems and projects, reviews, tests, etc.

Not open to students who have credit for Principles of Education 710, 755, or 756.

687. The Teaching of Mathematics. Three credit hours. Autumn Quarter. Three recitations each week: observations.

The educational values of the study of mathematics; objectives; principles of selecting and organizing the subject matter and learning activities appropriate to the junior and senior high school courses; methods, modes, and devices for teaching and testing; recent and contemporary studies of the teaching of mathematics.

Not open to students who have credit for Mathematics 681 or Principles of Education 735.

690. The Teaching of German. Three credit hours. Winter Quarter. Three recitations each week: observations. Mr. Kramer.

Values. Critical study of objectives and methods. Textbook selection. Classroom procedures. Readings, discussions, and reports.

Not open to students who have credit for German 665 or Principles of Education 725.

692. Methods and Techniques of Teaching Romance Languages. Five or seven credit hours. Autumn Quarter. Five meetings each week, combined and sectional: observations. General prerequisites must include Education 533 or it must be taken concurrently. Admission to a major in French or Spanish is also required. Mr. Tharp.

Lectures, readings, discussions and conferences.

Values. Objectives. Demonstrations and lectures on methods of teaching reading, grammar and pronunciation. Textbook analysis. Professional advancement. Examinations and marking. Eight observations of high school classes required.

Sections. Techniques of instruction. During the fourth to ninth weeks inclusive the class will meet four days a week in sections according to subject. The work of each section carries two hours of credit, and students may enroll in any sections for which they possess the prerequisites enumerated above.

Section A. French. Mr. Tharp.

Section B. Spanish. Mr. Tharp.

Lesson plans. Problems of presentation in the reading lesson, grammar, pronunciation. Construction of teaching materials. Choice of course content. Evaluation of classroom procedures.

Not open to students who have credit for Principles of Education 740 or 745.

694. The Teaching of Latin. Three credit hours. Spring Quarter. Three recitations each week: observations. Mr. Diederich.

Values. Teachers' equipment, objectives and methods. Classroom procedures. Lectures and assigned readings.

Not open to students who have credit for Latin 617 or Principles of Education 730 and 731.

696. The Teaching of Mechanical Drawing I. Three credit hours. Autumn Quarter. One lecture and two three-hour laboratory periods each week: observations. Mr. French.

Objectives and methods in teaching the language of graphics. Reading, visualizing, translating. Writing, freehand and with instruments. Theory of shape description, orthographic and pictorial projection. Theory of size description. Intersections and developments. Lettering.

Not open to students who have credit for Principles of Education 750.

697. The Teaching of Mechanical Drawing II. Three credit hours. Winter Quarter. One lecture and two three-hour laboratory periods each week: observations. General prerequisites must include Education 696. Mr. French.

Lettering in design. Bookplates. Heraldry in design. Methods of graphic reproduction. Planning a secondary school course, content, arrangement, methods of presentation, standards, examinations and grading. Drawing room and office equipment.

699. Extra-curricular Activities of Secondary School. Three credit hours. Winter Quarter. Mr. Eikenberry.

The principles, organization, administration and supervision of extra-curricular activities. Consideration will be given to home-room activities, pupil participation in school government, assemblies, clubs, publications, debating and dramatics, athletics, honor societies, social activities, control of participation in activities, and financial administration of activities.

Not open to students who have credit for School Administration 609.

701. Major Course in Secondary Education I. Five credit hours. Autumn Quarter. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Eikenberry.

A comprehensive survey of secondary education. This course is required of all graduate students whose field of specialization is secondary education.

702. Major Course in Secondary Education II. Five credit hours. Winter Quarter. This course is required of all students whose field of specialization is secondary education. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Alberty.

A continuation of Education 701.

†704. Laboratory Study in Secondary Education. Three credit hours. In addition to the general prerequisites, graduate standing in the field of education is required. Mr. Lindquist and Demonstration School Staff.

A graduate course in which secondary school principals, supervisors, superintendents and others interested in leadership in secondary education will study the demonstration school in action with the advantage of planned guidance and interpretation, contacts, and conferences with the staff. In addition to the general problems of the course, there will be opportunities for students to select individual topics for special study, and to consider the bearings of education transition on their own work in the field.

INDUSTRIAL EDUCATION

714. Analysis and Organization of Subject Matter in Industrial Education. Three credit hours. Winter Quarter. Three recitation periods each week. Mr. Smith.

Principles and practice in defining specific course objectives. Technique of analysis applied to various vocational lines for the selection of facts and activities conducive to desirable knowledge, skills, and behavior; and the organization of such materials into integrated courses of study and formulation of teaching plans.

Not open to students who have credit for Practical Arts and Vocational Education 680.

COMMERCIAL EDUCATION

721. Fundamental Principles of Teaching Commercial Subjects. Three credit hours. One Quarter. Autumn and Spring. Education 533 must be included in the general prerequisites or must be taken concurrently. Senior standing in Commercial Education curriculum is required.

A basic course in fundamental principles of teaching the commercial subjects. This course will orient the teachers in the entire field of commercial teaching in secondary schools and provide the background necessary for specialized courses 725 and 726.

***722. Principles of Commercial Education.** Three credit hours. Five recitations and one conference period each week. Required in curricula for commercial teachers.

For teachers of commercial subjects in the junior or senior high school. Meaning, purpose, and scope of commercial education in secondary schools. Importance of and procedure in making occupational surveys in the field of commercial education.

Not open to students who have credit for Practical Arts and Vocational Education 660.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

***724. Administration and Supervision of Commercial Education.** Three credit hours. Five recitations and one conference period each week.

A course designed for administrators and supervisors of commercial education in the junior and senior high school. Courses of study: laboratory facilities, selection and improvement of teachers in service; and other major executive problems.

Not open to students who have credit for Practical Arts and Vocational Education 665.

725. Selecting and Teaching Junior High School Commercial Subjects. Three credit hours. Winter Quarter. Education 721 must be included in the general prerequisites or must be taken concurrently. Required of all students who intend to do supervised teaching in junior high school commercial subjects.

A professional course for teachers of commercial arts (sometimes designated as general business science or junior business training) in junior high school for major purposes of exploration, guidance, and fundamentals of consumer business education. Teaching plans and observation of classroom procedures.

726. Selecting and Teaching Senior High School Commercial Subjects. Three credit hours. Spring Quarter. Education 721 must be included in the general prerequisites or must be taken concurrently. Required of all students who intend to do supervised teaching in senior high school commercial subjects.

A professional course for teachers of senior, technical or vocational commercial high school commercial subjects, including shorthand, typewriting, business English, office practice, bookkeeping, salesmanship, commercial law, commercial geography, commercial arithmetic, etc. Teaching plans and observation of classroom procedures.

SUPERINTENDENCY

727. Introduction to School Administration. Three credit hours. Autumn Quarter. In addition to the general prerequisites, graduate standing in the field of education is required. Required of graduate students preparing for school executive positions. Mr. Reeder.

Designed to give an overview of the organization and administration of education in the United States, and especially designed for persons who expect to become school executives. The following topics, among others, are discussed: federal, state, and local administrative organization for education; the function of school administration; finance and business management; the plant; the teaching corps; the pupils; the curriculum; textbooks and libraries; and records, reports, and public relations.

Not open to students who have credit for School Administration 651.

729. Administration of Rural and Village Schools. Three credit hours. Winter Quarter. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Clifton.

An analysis of the administrative duties of the chief school administrator of consolidated and village schools. This course places particular emphasis on problems of transportation, methods of adjustment for small enrollment and other problems peculiar to rural and village schools.

Not open to students who have credit for School Administration 610 and 650.

735. Business Administration of Schools. Three credit hours. Winter Quarter. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Reeder.

Function of business administration in the schools; administrative relationships; personnel of the business department; making the budget; procuring revenue; financial accounting; planning and constructing a building; architectural service; selecting and purchasing building sites; financial capital outlays; use of buildings; maintenance of the plant; the janitor; insurance of property; taking the inventory; school supplies; payroll procedure; school transportation.

Not open to students who have credit for School Administration 608 or 850.

738. Administration of Pupil Personnel. Three credit hours. One Quarter. Winter and Spring. Three lectures each week. Assigned readings,

* Not given in 1936-1937.

investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Clifton.

Compulsory education laws and working certificates of Ohio; main requirements in other states. Census information it should secure, its use, legal requirements in different states. Attendance—organization of departments, amount and causes of non-attendance, devices to improve attendance. School record systems—forms used, items recorded, and uses. Reporting systems—need of uniformity in recording and reporting systems. Age-grade-progress studies. Elimination, grading and promotion. Classification. Definition of terminology. Visiting teacher. Marking systems.

Not open to students who have credit for School Administration 601.

742. Legal Aspects of School Administration. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Clifton.

A study of the laws and judicial decisions of various states, relating to education, in order to discover the legal principles involved. Major topics; authority and responsibility of teachers; rights, privileges, and responsibilities of students; teachers' contracts and pensions; legal and illegal use of school property; contractural capacity and liability of public school officials; school boundaries and districts; taxation; legal aspects of the curriculum; expenditures of school money. Primarily for supervisory and administrative officials.

Not open to students who have credit for School Administration 813.

†744. Administration of Teacher Retirement and Pension Systems. One credit hour.

A general introductory treatment of the problems involved in creating and maintaining an adequate retirement system for the teachers of a state.

Not open to students who have credit for School Administration 670.

†746. Administration of School Libraries. Two credit hours. Four lectures each week. Assigned readings and reports. Open to Seniors and graduate students with permission of the instructor in charge.

Designed to meet the needs of school librarians and general administrative school officers. Principal topics: history and development of the school library; its place in educational systems; standards and state regulations; rooms, equipment, and budgets; selection, acquisition, and care of books; publicity and cooperation with other agencies; instruction in the use of books, relation of librarian to teachers and school officials.

GUIDANCE

750. Fundamentals of Guidance. Five credit hours. Autumn Quarter. Mr. Stone.

A basic but advanced course for all students desiring a comprehensive knowledge of the history, theory, and practices of guidance. Especially for graduate students desiring to major in personnel. The course will consider the aims of guidance, materials, techniques, counseling, and research instruments of all major divisions of student personnel service.

Not open to students who have credit for Practical Arts and Vocational Education 470.

752. Guidance through Social-Economic Studies. Five credit hours. Spring Quarter. Mr. Stone.

This course is organized with particular reference to the needs of school advisers and teachers of social-economic (vocational) studies for major purposes of guidance.

Not open to students who have credit for Practical Arts and Vocational Education 610.

754. The Administration of Guidance Programs. Three credit hours. Spring Quarter. General prerequisites must include Education 750. Graduate standing in the field of education is required. Mr. Clifton.

Designed for school superintendents and high school principals and other executive officers in junior and senior high schools and junior colleges. Critical examination of the organization and administration of guidance programs in large and small school systems; the development of guidance programs for the school systems represented by the class membership.

Not open to students who have credit for School Administration 826.

† Not given during the academic year, 1936-1937.

SPECIAL AND ADULT EDUCATION

764. Supervised Teaching in Special Classes. Five credit hours. Spring Quarter. Mr. Berry.

Practice teaching for qualified students in classes for the mentally retarded, for behavior problem children, for the defective in speech, or for the deaf and the hard of hearing.

Students will be expected to devote one-third of their time, under the supervision of the University instructor in charge, to this course.

Not open to students who have credit for Principles of Education 656.

†765. Principles and Methods of Teaching the Mentally Retarded. Three credit hours. General prerequisites must include twenty Quarter credit hours in education and allied subjects of which ten approved by the instructor must be in education. Mr. Berry.

A critical study of the various methods which are used in teaching the mentally retarded. In connection with this course, opportunity for practice teaching mentally retarded children will be provided for students desiring it.

Not open to students who have credit for Principles of Education 654.

766. Principles and Methods of Teaching Behavior Problem Children. Three credit hours. Winter Quarter. General prerequisites must include twenty Quarter-credit hours in Education and allied subjects of which ten approved by the instructor must be in Education. Mr. Berry.

A critical study of principles and methods used in the adjustment of behavior problem children.

Not open to students who have credit for Principles of Education 655.

767. Administration of Special Education. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, reports, and field trips. General prerequisites must include Education 727 or permission of the instructor in charge must be obtained. Mr. Heck.

History and development of special schools and classes; types defined; place in education; state encouragement and regulations; types of control; internal government; buildings and rooms; equipment; costs, teacher-training, experience, salaries; selection of other employees; characteristics of children; principles governing admittance, retention, and withdrawal; curriculum—academic, industrial, extra-curricular; methods of follow-up, etc.

Not open to students who have credit for School Administration 637 or 836.

770. Adult Education. Three credit hours. Winter Quarter. In addition to the general prerequisites, graduate standing in the field of education or permission of the instructor is required. Mr. Berry.

A study of the nature, extent, and significance of adult education. Consideration of the psychological characteristics of the adult, influence of social and economic factors on adult needs, history and types of adult education, present trends, future development.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36, also on page 84.

950. Research in Education. Autumn, Winter, and Spring Quarters. Students may, with the approval of their advisers, register for more than one section of 950 or for the same section two or more times.

By permission of the Executive Committee of the Department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under members of the Bureau staff.

(a) Commercial Education. Mr. Stone.
(b) Elementary Education. Mr. Brim, Miss Zirbes, Mr. Lindquist, Mr. Warner, Miss Bronsky, Mr. Heck.
(c) Curriculum Techniques. Mr. Charters.
(d) Guidance. Mr. Stone, Mr. Clifton, Mr. Warner, Mr. Smith, Mr. Anderson, Mr. Heck.
(e) Higher Education. Mr. Klein, Mr. Tyler, Mr. Hullfish.
(f) History of Education. Mr. Good, Mr. Eckelberry.
(g) Industrial Arts Education. Mr. Warner, Mr. Smith.
(h) Philosophy of Education. Mr. Bode, Mr. Hullfish.

† Not given during the academic year, 1936-1937.

(i) Secondary Education. Mr. Alberty, Mr. Eikenberry, Mr. Lindquist, Mr. Davis, Mr. Landsittel, Mr. Eckelberry.
(j) Special and Adult Education. Mr. Berry, Mr. Heck.
(k) Superintendency. Mr. Lewis, Mr. Reeder, Mr. Davis, Mr. Clifton, Mr. Heck, Mr. Holy, Mr. Bennett.
(l) Teaching of English. Mr. Seely, Mr. Eberhart.
(m) Teaching of Social Studies. Mr. Pahlow, Mr. Landsittel.
(n) Teaching of Foreign Languages. Mr. Tharp.
(o) Teaching of Mathematics.
(p) Teaching of Science.
(q) Vocational Industrial Education. Mr. Stone, Mr. Warner, Mr. Smith.

GENERAL AND BASIC

802. The Preparation of Theses and Other Scientific Reports. Three credit hours. Winter Quarter. Open with permission of the instructor. Mr. Reeder.

Emphasizes methods of research with special emphasis upon the preparation of theses. The following topics, among others, are treated: types of research; criteria for selecting and planning the problem; preparing the working and the final bibliographies; the securing of data; the organization, presentation, and interpretation of material; the form of citations; and the preparation of statistical tables and illustrations.

Not open to students who have credit for School Administration 800.

804. Educational Experimentation. Five credit hours. Spring Quarter. Miss Zirbes, Mr. Tyler.

A consideration of significant aspects of the changing educational situation with particular reference to their implications for research. Methods of investigation and techniques of experimentation applicable to the evaluation of current trends in elementary, secondary and higher education.

806. Techniques of Curriculum Construction. Five credit hours. Autumn Quarter. Open to students who have completed one year of graduate work in education. Mr. Charters.

This course deals with those techniques of curriculum construction which are used in the assembling of raw materials for the curriculum; the techniques for the determination of objectives; activity, trait, and difficulty analysis; the evaluation of activities; sampling, interviewing; and other techniques connected with the collection of raw material.

PHILOSOPHY OF EDUCATION

811. Seminary: Special Problems in Educational Theory. Three credit hours. One Quarter. Autumn, Winter, Spring. Mr. Hullfish.

HISTORY OF EDUCATION AND COMPARATIVE EDUCATION

814. Comparative Education. Five credit hours. Winter Quarter. Lectures and research. General prerequisites must include ten hours in the history of education. Mr. Eckelberry.

A survey of the present school systems of selected countries such as England, France, Germany, Russia, Canada, Argentine Republic, Australia, Denmark in comparison with the United States; and the study of topics such as the relation of national and local government to education; the sources of school support; the preparation of teachers; the methods and agencies of adult education.

Not open to students who have credit for History of Education 613 or 614, or School Administration 612 or 812.

816. Seminary in the History of Education. Two to five credit hours. Autumn, Winter, and Spring Quarters. Required of all candidates for advanced degrees specializing in the history of education. General prerequisites must include fifteen hours in the history of education. Mr. Good, Mr. Eckelberry.

ELEMENTARY EDUCATION

*824. **Curriculum Problems in Elementary Education.** Three credit hours. Autumn Quarter. General prerequisites must include Education 651-652. Mr. Brim.

A critical study of the reorganization, construction, and administration of the elementary school curriculum in the light of modern educational principles and objectives, the data contributed by research and the best current practices found throughout the country. Special attention will be given to organization of staff for curriculum study, to the basic issues in realizing a sound curriculum and to the installation, adaptation and administration of the revised curriculum.

Not open to students who have credit for Principles of Education 614 and School Administration 640.

825. **Elementary School Administration and Supervision.** Three credit hours. Spring Quarter. General prerequisites must include Education 651-652. Mr. Brim.

A critical analysis of current practice in the organization, administration, and supervision of the elementary school. Formulation of guiding principles and effective program, practical implications of creative democratic leadership in efficient management, in the diagnosis of teaching, in the professional development of personnel, in the creative use of school and community activities, and in the broader public and professional relations of the school.

Not open to students who have credit for Principles of Education 613 or School Administration 628.

*826. **Practice in Supervision.** Three credit hours. Spring Quarter. Alternative with Education 827. General prerequisites must include Education 825. Miss Zirbes.

Typical school problems will be used to provide practice in the techniques of supervisory service. Emphasis will be placed on the application of principles of supervision to actual classroom situations.

827. **Laboratory Problems in Child Development.** Three credit hours. Spring Quarter. General prerequisites must include Education 651-652. Miss Zirbes.

Students will make special studies of individuals and cooperative studies of groups at various levels of development under the direction of the instructor and with the cooperation of members of the staff of the University School.

*828. **Seminary in Elementary Education.** Two to five credit hours. Autumn Quarter. General prerequisites must include fifteen hours of graduate work in education, approved by the instructor. Mr. Brim.

SECONDARY EDUCATION

829. **High School Administration and Supervision I.** Five credit hours. Spring Quarter. This course is required of all students whose field of specialization is secondary education. General prerequisites must include Education 701 and 702. Mr. Davis.

A comprehensive survey of the major problems and issues in administration and supervision of the secondary school.

Not open to students who have credit for Principles of Education 610.

830. **High School Administration and Supervision II.** Five credit hours. Winter Quarter. This course is required of all graduate students whose field of specialization is secondary education and who are preparing for secondary school principalships. General prerequisites must include Education 701 and 702. Mr. Eikenberry.

An advanced course in the specialized techniques of high school administration.

Not open to students who have credit for School Administration 632, 633, 831, or 832.

831. **The Secondary School Curriculum.** Five credit hours. Spring Quarter. General prerequisites must include Education 700 or 701. Required of all

* Not given in 1936-1937.

graduate students whose field of specialization is secondary education. Mr. Alberty.

A critical study of the construction, reorganization and administration of secondary school curricula and programs of study.

Not open to students who have credit for Principles of Education 625.

832. **The Junior College.** Three credit hours. Winter Quarter. General prerequisites must include Education 701 and 702. Mr. Klein.

The origin and development of junior colleges, including a critical survey of the several types: private, state and municipal. The place of the junior college in secondary education and readjustments in secondary and higher education that result from the junior college movement.

Not open to students who have credit for School Administration 840.

837. **Seminary in Secondary Education.** Three to five credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Education 701 and 702. Mr. Alberty, Mr. Eikenberry, Mr. Davis, Mr. Eckelberry.

A seminary for advanced graduate students whose field of specialization is secondary education.

*838. **The Teaching and Supervision of English in the Secondary Schools.** Three credit hours. Conferences, readings, reports. General prerequisites must include Education 670 (670a and 670b) and 671 (672) or permission of the instructor. Mr. Seely.

The course consists of two phases: (1) the analysis of contemporary contributions to the reorganization of materials and methods of secondary school English; (2) the study by each student of an individually selected problem.

839. **Seminary in the Teaching of the Social Studies in the Secondary Schools.** Three credit hours. One Quarter. Autumn and Spring. Mr. Pahlow.

842. **Seminary in the Teaching of Mathematics and Physical Science.** Two or more credit hours. Autumn and Spring Quarters. One two-hour period each week. Problems of minor or major research in the teaching of the physical sciences and mathematics in secondary schools. Required of all students who are working toward an advanced degree in this field. General prerequisites must include a minimum of twenty Quarter-credit hours in mathematics or physical science approved by the instructor.

Not open to students who have credit for Principles of Education 821 or 822.

843. **Seminary in the Teaching and Supervision of Foreign Languages.** Three credit hours. Spring Quarter. General prerequisites must include thirty Quarter-credit hours, or the equivalent by course credit approved by the instructor or by comprehensive examination, in a foreign language taught in secondary schools. Mr. Tharp.

Not open to students who have credit for Principles of Education 846.

HIGHER EDUCATION AND TEACHER TRAINING

845-846. **Higher Education I; Higher Education II: Basic Courses.** Five credit hours. Autumn and Winter Quarters. The work of each Quarter is so arranged that either course may precede the other. General prerequisites must include ten Quarter-hours in secondary education and the satisfaction of basic course requirements for all graduate students in education. Open only to graduate students majoring in higher education, including teacher training. Mr. Klein, Mr. Hullfish.

A basic survey of problems in higher education, particularly as these relate to theory, history, organization and administration, curriculum and method, and student personnel, including measurement.

847. **Theory and Administration of Higher Education.** Five credit hours. Winter Quarter. General prerequisites must include five hours in education

* Not given in 1936-1937.

approved by the instructor and the satisfaction of basic course requirements for all graduate students in education. Mr. Klein.

This course will study the theoretical and practical problems involved in the administration of institutions of higher education under modern social conditions.

Not open to students who have credit for Principles of Education 823 or School Administration 801.

848. **Curriculum and Method of Higher Education.** Five credit hours. Spring Quarter. General prerequisites must include five hours in higher education and the satisfaction of basic course requirements for all graduate students in education. Mr. Hullfish.

A study of the development, principles, and administration of the curriculum and of teaching method in higher education.

Not open to students who have credit for Principles of Education 819 or School Administration 860.

850. **Teacher Training.** Five credit hours. Autumn Quarter. General prerequisites must include five hours in higher education and satisfaction of basic course requirements for all graduate students in education. Mr. Klein, Mr. Brim, Mr. Eikenberry.

A study of the problems of history, organization, administration, curriculum and method, student personnel (including measurement) peculiar to teacher training institutions.

852. **Achievement Tests in Higher Education.** Three credit hours. Winter Quarter. One two-hour period each week. In addition to the general prerequisites, permission of the instructor is required. Mr. Tyler.

A course for college instructors and research workers, to acquaint them with the techniques used in measuring attainment in the several fields of college instruction. Each student will carry on an examination project in his field.

Not open to students who have credit for School Administration 872.

INDUSTRIAL EDUCATION

856. **Practicum in Industrial Arts Education.** Three to five credit hours. Winter Quarter. Mr. Warner.

Investigations, reports and discussions concerning: nomenclature, historical development; analysis of professional objectives for their concepts; emphasis by grade levels; criterion basis of content selection and appraisal; teaching methods and devices; physical planning; organization; laboratory operation; testing; the teacher and his profession.

Not open to students who have credit for Practical Arts and Vocational Education 608.

857. **Administration of Industrial Education in Secondary Schools.** Three credit hours. Spring Quarter. Mr. Stone.

Relation of Industrial Arts and Vocational Education to the general curriculum and the administrative responsibilities entailed. Courses of study; laboratory and shop provisions in building plans; equipment; relative costs; coordination problems; class and shop organization, and the development of an effective program of supervision. Selection of teachers and their improvement in service.

Not open to students who have credit for Practical Arts and Vocational Education 625.

COMMERCIAL EDUCATION

860. **Scientific Studies in the Practical Arts and Vocational Education.** Two credit hours. Autumn Quarter. Mr. Warner.

An extensive view of research techniques applicable to the practical arts and vocational education; critical review and evaluation of published research examples in these fields; recognition and refinement of problems; study of research treatment; methods of writing and presenting research reports.

By permission of the Chairman of the Department of Education and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

Not open to students who have credit for Practical Arts and Vocational Education 801.

862. **Seminary in Practical Arts and Vocational Education.** Two credit hours each Quarter. Winter and Spring. General prerequisites must include Education 860. Mr. Warner, Mr. Smith, Mr. Bollinger.

Development of research problems. Topical reports and discussions. Preparation of theses or dissertations.

By permission of the major professor and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

†866. **Research in the Laboratory of Industries.** Three or more credit hours. Conferences and studies using the activities in the Laboratory of Industries as a basis for research. In addition to the general prerequisites, teaching experience in Industrial Arts or Vocational Industrial Education and permission of the instructor are required. Mr. Warner.

Individual or group studies on a combination practicum and laboratory basis with the publication of either a professional or technical bulletin as a goal. Selection to meet the requirements of the group are suggested by: pupil study, diagnosis and achievement; problems of organizing, supervising, planning, equipping, supplying and maintaining a Laboratory of Industries; units of content; studies of industry; analysis of method; experimentation.

Not open to students who have credit for Practical Arts and Vocational Education 800.

SUPERINTENDENCY

†871. **Administrative Problems of the City Superintendent.** Three credit hours. Five lectures each week and assigned readings and reports. Mr. Lewis.

An advanced course for city superintendents. A study of the social and legal status of the city superintendent; his civic and economic relationship to agencies of the community; an intensive study of specific problems of immediate and outstanding importance in their relationship to the administration of a city school system such as: N.R.A., finance, county reorganization, educational bearings of recent social and economic development, locally and nationally.

Not open to students who have credit for School Administration 830.

873. **Staff Personnel Administration.** Four credit hours. Autumn Quarter. General prerequisites must include Education 727. Mr. Lewis.

Definitions; rise of industry, government and education; philosophy of; man analysis and job analysis; selection; interviewing; in-service training; appraisement; supervision; absenteeism; marital condition; promotion; contracts, certification, dismissal, health and recreation; ethics, morale; public and professional relations; pensions; tenure; salary schedules and other factors of economic and professional welfare.

Not open to students who have credit for School Administration 605 or 827.

875. **School Finance.** Three credit hours. Autumn Quarter. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Reeder.

The literature and sources of data; trends of school costs; outlook for future costs; possible school economics; school expenditures vs. ability to expend; sources of school revenues; meeting a financial stringency; the equalization of educational opportunity; the control of school funds; school indebtedness.

Not open to students who have credit for School Administration 607, 851, or 734.

878. **Federal and State School Administration.** Three credit hours. Winter Quarter. Three lectures each week. Assigned readings, investigations and reports. General prerequisites must include Education 727. Mr. Clifton.

Present conditions and the program of the federal department of education and of the departments of education of the several progressive states. The adjustment between national and state programs and the relationship of both of these to local administrative agencies. The state administration of the schools of Ohio.

Not open to students who have credit for School Administration 611 or 811.

880. **Planning, Constructing, and Equipping School Buildings.** Five credit hours. Spring Quarter. Assigned readings, observation trips, reports. General prerequisites must include Education 727. Mr. Davis.

A study of the major problems involved in determining the school building needs of a community, techniques for determining room requirements, types of buildings, their construction

† Not given during the academic year, 1936-1937.

and adaptation to educational needs, school sites and present day equipment for school buildings, including types and arrangement of equipment for special and regular rooms, auditoriums, gymnasiums, libraries, cafeterias, offices, service systems, methods of selecting and purchasing equipment.

Not open to students who have credit for School Administration 606, 647, 648, 855, 856.

882. Seminary in School Administration. Two to five credit hours. Autumn, Winter, and Spring Quarters. At least one Quarter required of majors in the Superintendency. General prerequisites must include Education 727. Mr. Lewis, Mr. Reeder, Mr. Davis, Mr. Heck.

Specifically designed to aid students preparing masters' and doctors' theses. Students required to meet once a week as a group for discussions and direction.

SPECIAL AND ADULT EDUCATION

897. Seminary in Special Education. Three to five credit hours. Spring Quarter. In addition to the general prerequisites, graduate standing in the Department of Education or Psychology, and permission of the instructor are required. Mr. Berry.

NOTE: For additional courses in special education, see Bureau of Special and Adult Education, page 54.

ELECTRICAL ENGINEERING
Office, 171 Robinson Laboratory

PROFESSORS DREESE, CALDWELL, BIBBER, AND EVERITT, ASSOCIATE PROFESSOR KIMBERLY, ASSISTANT PROFESSORS TANG AND BYRNE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Direct Current Apparatus. Five credit hours. One Quarter. Summer, Autumn, and Spring. Three class hours and three laboratory hours each week. General prerequisites must include Mechanics 601.

Generators and motors; a study of their theory, construction, and operation.

603. Alternating Current Circuits. Five credit hours. One Quarter. Summer, Autumn, and Winter. Five class hours each week. General prerequisites must include Mechanics 601. Mr. Tang.

Resistance, inductance, capacitance, reactance, impedance, series and parallel circuits, complex circuits, power, power factor, polyphase systems. Complex notation, non-sinusoidal waves, wave analysis, symmetrical components and transients in simple circuits.

604. Alternating Current Laboratory. Two credit hours. One Quarter. Summer, Autumn, and Winter. Three laboratory hours each week. General prerequisites must include Mechanics 601. Electrical Engineering 603 must be taken concurrently. Mr. Tang.

Laboratory study of series and parallel circuits, polyphase circuits, phase differences, and wave forms.

607. Applied Electronics. Four credit hours. One Quarter. Autumn and Winter. Three class hours and two laboratory hours each week. General prerequisites must include Electrical Engineering 603. Mr. Byrne.

An elementary study of electronic phenomena, electronic devices, and their application to electrical engineering.

611. Medium and High Frequency Currents. Five credit hours. One Quarter. Winter and Spring. Three class hours and one three-hour laboratory period each week. General prerequisites must include Electrical Engineering 607. Mr. Everitt, Mr. Byrne.

General analysis of alternating current circuits under wide ranges of frequency and impedance conditions. Network theorems, resonance phenomena, vacuum tube amplifiers, and a study of the conversion between mechanical or acoustical energy and electrical energy over wide frequency ranges. Alternating current measurements at medium and high frequencies.

642. Electrical Engineering. Four credit hours. One Quarter. Autumn, Winter, Spring. Three class hours and three laboratory hours each week. Mr. Caldwell, Mr. Kimberly.

The electric current and its effects. Direct and alternating current circuits. Electrical measurements. Magnets and their application. Generators. Transformers.

643. Electrical Engineering. Four credit hours. One Quarter. Autumn, Winter, Spring. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 642 or equivalent. Mr. Caldwell, Mr. Kimberly.

A continuation of electrical engineering fundamentals. Transmission and distribution. Motor characteristics, applications and control. Economic aspects, costs, and rates.

661. Electrical Engineering Survey. One-half credit hour. Autumn Quarter. One class hour each week. Mr. Bibber.

A course of lectures designed to give electrical engineering students some insight into other fields of thought.

701. Alternating Current Apparatus. Three credit hours. One Quarter. Autumn and Winter. Three class hours each week. General prerequisites must include Electrical Engineering 601 and 603. Electrical Engineering 705 must be taken concurrently. Mr. Dreese, Mr. Caldwell.

Theory of transformers, induction motors, and related apparatus.

702. Alternating Current Apparatus. Three credit hours. One Quarter. Winter and Spring. Three class hours each week. General prerequisites must include Electrical Engineering 701. Electrical Engineering 706 must be taken concurrently. Mr. Bibber, Mr. Tang.

Theory of alternators, synchronous motors, converters, and other apparatus.

703. Advanced Alternating Current Circuits. Four credit hours. Autumn Quarter. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 611. Mr. Everitt.

The propagation of alternating currents over long lines for power and communication purposes, loading, electric filters, inductive interference, modulation.

705. Alternating Current Laboratory. Four credit hours. One Quarter. Autumn and Winter. Five laboratory hours each week. Concurrent, Electrical Engineering 701. Mr. Kimberly, Mr. Byrne.

Laboratory study of transformers and induction motors.

706. Alternating Current Laboratory. Four credit hours. One Quarter. Winter and Spring. Five laboratory hours each week. Concurrent, Electrical Engineering 702.

Laboratory study of alternators, synchronous motors, and converters.

711. Generation, Transmission, Distribution, and Utilization of Electric Power. Four credit hours. Winter Quarter. Three class hours, three laboratory hours, and six hours of preparation each week. General prerequisites must include Electrical Engineering 703. Mr. Bibber.

A comprehensive view of the methods of generating electric power by thermal and water power plants, especial attention being devoted to the electrical aspects of such plants, a detailed consideration of electric power transmission and distribution, and a study of the utilization of electric power in industry, covering the use of electric heat, and those applications in which electricity and mechanics must of necessity be treated concurrently.

712. Generation, Transmission, Distribution, and Utilization of Electric Power. Four credit hours. Spring Quarter. Three class hours, three laboratory hours, and six hours of preparation each week. General prerequisites must include Electrical Engineering 711. Mr. Bibber.

A continuation of Electrical Engineering 711.

717. Communication Engineering. Four credit hours. Winter Quarter. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 716. Mr. Everitt, Mr. Byrne.

Coupled circuits, impedance matching networks, and the use of vacuum tubes as oscillators, amplifiers and detectors at medium and high frequencies.

720. Electrical Illumination. Four credit hours. Winter Quarter. Three class hours and three laboratory hours each week. Mr. Caldwell, Mr. Tang.

Illumination, its development and present methods. Modern light-sources, and modification of light by reflectors, globes and other accessories. Light phenomena associated with illumination, such as reflection, transmission and absorption, direction and diffusion, refraction and color. Infra-red and ultra-violet radiation. Applications of illumination to industrial work, buildings, street-lighting, aviation, light-projection, etc.

722. Electrical Illumination. Three credit hours. Autumn Quarter. Three class hours each week. Mr. Caldwell.

Modern lighting, both electric and daylight, especially as applied to buildings, such as industrial plants, stores, schools, residences, etc. A brief study of lamps and accessories and the phenomena of reflection, transmission, glare, diffusion, color, etc., as they affect illumination design. Circuits for electric lighting and their control.

726. Advanced Electrical Communication. Four credit hours. Spring Quarter. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 717. Mr. Everitt, Mr. Byrne.

An advanced study of medium and high frequency alternating current circuits. Radiation fields and their measurement.

732. Engineering Projects. Four credit hours. Winter Quarter. Six hours in calculation periods and six hours of preparation each week. General prerequisites must include Electrical Engineering 741, Mechanics 607, Electrical Engineering 611. Mr. Dreese.

A study of electrical projects involving a correlation of the fundamental principles of mechanics, heat, finance and electrical engineering for some desired end. Another important objective of the course is to inculcate the spirit of the attack on an engineering problem and to demonstrate the interplay of factors involved in a decision by an engineering organization.

741. Engineering Economics. Three credit hours. Autumn Quarter. Three class hours each week. General prerequisites must include Electrical Engineering 601 and 603 or 642 and 643. Mr. Bibber, Mr. Tang.

Elementary principles of engineering finance involving corporate finance and design finance. To illustrate general principles the more familiar electric power plant and distributing system is used as an example.

760-761-762. Advanced Theoretical Study of Electrical Engineering Practice and Equipment. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. All instructors.

765-766-767. Special Advanced Laboratory. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. All instructors.

770. Analysis of Electrical Engineering Problems. Three credit hours. Spring Quarter. Three class hours each week. General prerequisites must include Electrical Engineering 603. Mr. Tang.

The content will be selected from the following fields: theory of equations, differential equations, Heavyside operators. The applications will be illustrated by examples from electrical engineering and related fields.

780. Engineering Industrial Problems. Three credit hours. Spring Quarter. Three class periods and six hours of preparation each week. Elective, Mechanical Engineering, fourth year. Prerequisite, Electrical Engineering 701 or 702, or 642 or 643. Mr. Kimberly.

Layout of electrical distribution systems for factories and municipalities, electrolysis investigation, special cases of electric drive and control, engineering aspects of patents.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION." page 36.

These prerequisites include foundation courses in mathematics, physics and electrical measurements.

The general prerequisites include for 821 and 824, Electrical Engineering 701 and 702, or equivalent; for 825, Electrical Engineering 824; for 826, Electrical Engineering 824; for 832, Electrical Engineering 717, or equivalent.

Graduate work will be given to individual students and groups under the course numbers given below. The following are the fields of special interest of the instructors listed. Other lines of study are, however, taken up under their supervision. Mr. Dreese, Electrical Machinery. Mr. Caldwell, Alternating Current Apparatus and Illumination. Mr. Bibber, Transmission and Distribution, Alternating Current Apparatus, Electric Traction. Mr. Everitt, Electrical Communication. Mr. Kimberly, Electrical Instruments, Alternating Current Apparatus. Mr. Tang, Illumination, Alternating Current Apparatus, Electrical Mathematics. Mr. Byrne, Electronics, Electric Radiation.

801-802-803. Advanced Theoretical Study of Electrical Engineering Practice and Equipment. Credit hours to be arranged. Autumn, Winter, and Spring Quarters.

805-806-807. Advanced Laboratory Study of Electrical Engineering Equipment. Credit hours to be arranged. Autumn, Winter, and Spring Quarters.

821. Revolving Fields and Permeances in Electrical Machinery. Three credit hours. Autumn Quarter. Three class hours each week. Mr. Dreese.

An analysis of the various revolving and stationary fields found in electrical machinery. The origin and effects of both useful and parasitic fluxes are considered. Discontinuities and cusps in speed-torque curves of induction machines, synchronous-motor effects in induction machines, sub-synchronous speeds in induction and synchronous machines, and design for sub-synchronous operation are topics studied in this course.

822. Revolving Fields and Permeances in Electrical Machinery. Three credit hours. Winter Quarter. Three class hours each week. Mr. Dreese.

Continuation of Electrical Engineering 821.

824-825-826. Advanced Synchronous Machine Theory. Three credit hours. Autumn, Winter, and Spring Quarters. Three class hours and six hours of preparation each week. Mr. Bibber.

Review of fundamental considerations, general development of theory of symmetrical components, application to unbalanced loads on generators and systems, transient characteristics of synchronous machines, and system stability.

831. Transmission Networks. Three credit hours. Winter Quarter. Three class hours each week. General prerequisites must include Electrical Engineering 716. Mr. Everitt.

Generalized treatment of transmission networks. Reflection and interaction factors. Advanced design and computation of filter systems and equalizing networks. Inductive interference.

832. Electromagnetic Radiation and Radiating Systems. Three credit hours. Spring Quarter. Three class hours each week. Mr. Everitt.

Scalar and vector fields. Maxwell's equations, electromagnetic radiation and propagation, antenna systems.

833. Electro-Acoustical Systems. Three credit hours. Autumn Quarter. Three class hours each week. Mr. Everitt.

Study of the production, transmission, and utilization of acoustic energy by electrical means. Microphones, loud speakers, horns, the laws of mechanical vibrating systems and their coupling to electrical networks, the laws of sound propagation, and the acoustic treatment of sound enclosures.

950. Research in Electrical Engineering. Autumn, Winter, and Spring Quarters. All instructors.

NOTE: Detailed schedules of graduate studies available under the above course number may be obtained on application to the Department of Electrical Engineering.

ENGINEERING DRAWING
Office, 218 Brown Hall

PROFESSORS FRENCH AND PAFFENBARGER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

701. Chemical Machine Drawing. Two credit hours. Winter Quarter. Six laboratory hours each week. Mr. Paffenbarger.

The drawing and introduction to the design of machinery and apparatus as related to industrial chemistry and chemical engineering.

704. Chemical Plant Layout and Design. Four credit hours. Spring Quarter. Twelve laboratory hours each week. General prerequisites must include Engineering Drawing 701. Mr. Paffenbarger.

Sketching and preliminary layout of industrial chemical plants. Design and drawing of a complete plant for the manufacture of a chemical or related product.

NOTE: TEACHING COURSES. For the Teaching Courses in this department see the Department of Education, Courses 696 and 697.

ENGINEERING EXPERIMENT STATION

The Engineering Experiment Station is a division of the College of Engineering and was established by law to conduct technical research. The Station is authorized to cooperate with divisions of the State and National governments and with private individuals and corporations.

In many cases the Station investigations are such as may properly be conducted by graduate fellows working under direction of members of the faculty or Station staff. It follows, therefore, that not infrequently candidates for a graduate degree work out their theses or dissertations utilizing the equipment of the Station.

ENGLISH
Office, 121 Derby Hall

EXECUTIVE COMMITTEE: PROFESSOR PERCIVAL, ASSOCIATE PROFESSORS WALLEY AND FULLINGTON

PROFESSORS McKNIGHT, GRAVES, BECK, KETCHAM, PERCIVAL, WILEY, HATCHER, AND WALLEY, ASSOCIATE PROFESSORS HARBARGER, SNOW, WILSON, FULLINGTON, AND POLLOCK, ASSISTANT PROFESSORS MILLER, CRAIG, AND NEWDICK, MR. EMSLEY, MR. LOGAN, MR. PARKER, MR. UTLEY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

General Information for Graduate Students:

(1) Graduate study in English requires an undergraduate major in English (i.e., not less than forty Quarter hours in "600" courses related to English, twenty-five of which shall be in the English department), and a reading knowledge of either French or German. Students deficient in either of these respects in order to qualify for admission to candidacy for the M.A. degree, must be prepared to make up the deficiency by taking such extra work as the department may deem necessary. This will entail a longer period of residence.

(2) The graduate courses elected in preparation for the M.A. degree in English may be confined to courses offered by the English department, but this extreme concentration is not required. A student is not only permitted, but urged, to elect related courses (not exceeding one-third of his entire program) offered by other departments. Courses recognized as suitable for such election are the graduate courses in foreign languages, in history, and in philosophy, and

the following additional courses: Psychology 607, 621, 626, 630, 631, 645; Education 617, 670 (670-a, 670-b), 671 (672); Music 601, 602, 603, 605; Fine Arts 654; Political Science 621, 622, 623. Other courses, to be acceptable, must have the approval of the Graduate Committee of the English Department.

(3) The faculty adviser of the student shall examine the student's preparation in English and in allied subjects and plan with him a suitable program of graduate study, including reading which is not a specified part of any particular course. The student is expected to consult with the instructor in charge of any "800" course before enrolling in it.

(4) Graduate study in the English Department may be centered in the field of literature, of language, or of dramatic art.

For the M.A. degree in English literature a candidate must offer evidence of (a) a detailed knowledge of two of the principal periods as presented in the cycles, (b) a knowledge of the history of the English language and literature. For the detailed program the student should consult his adviser.

To satisfy partially the first requirement, candidates for the M.A. degree in literature must complete three courses in one of the following cycles:

Cycle I. The Middle Ages. English 652, 653, 654.
Cycle II. The Renaissance. English 674, 676, 671, 677.
Cycle III. The Age of Enlightenment. English 635, 636, 637.
Cycle IV. The Age of Democracy. English 641, 642, 644.

In general, the student is urged to take the courses in the Cycle in the indicated order. However, courses may be taken in any order (except in Cycle IV) and the time may be extended over a longer period. To complete the first requirement, it is expected that the candidate will have completed one other Cycle (or its equivalent) as an undergraduate. If he has not, he is expected to make up the deficiency either in course or out of course. It is further expected that the candidate will take at least one seminary in literature.

NOTE: Courses in the Cycles may be elected by qualified students as freely as any other courses. Students electing one Cycle may choose at will from the general elective courses and the courses in other Cycles. Students not majoring in English need pay no attention to the Cycles.

The requirement of the Cycle does not apply to students who entered upon their graduate major before the Autumn Quarter of 1934-1935. However, they may conform to these requirements at their own option.

For the M.A. degree in English language a candidate must offer evidence of (a) a general knowledge of phonetics and language history, (b) a detailed knowledge of the stages in the development of the English language and an acquaintance with the literary history which forms a background in the development of the language, and (c) a detailed knowledge of one period of English literature as represented in one of the Cycles. It is expected that the candidate will have acquired the knowledge indicated in (c) as an undergraduate. If he has not, he is expected to make up this deficiency either in course or out of course.

For the M.A. degree in dramatic art a candidate must offer evidence of (a) a detailed knowledge of stagecraft and of theories and methods of play production, (b) a general knowledge of English dramatic literature, and (c) a detailed knowledge of one of the periods of English literature represented in the Cycles. It is expected that the candidate will have acquired the knowledge indicated in (c) as an undergraduate. If he has not, he is expected to make up this deficiency either in course or out of course.

(5) The test of qualification for admission to candidacy for the M.A. degree will be a written examination taken by students who have fully satisfied the entrance requirements and who have completed thirty hours of graduate work.

(6) The Master's thesis should normally develop in one of the graduate courses concerned with the student's field of major interest. A maximum credit of five hours will be allowed for the completion of the thesis and the required reading out of course.

The seminary courses numbered in the 800 group, entitled "Advanced Reading and Study" have as their aim both a wider and more thorough reading in the literature and scholarship of the field than is possible in the related cyclical courses, and a personal investigation which leads to a report or thesis. Other courses numbered in the 800 group have as their aim the guidance of the student in investigation of specialized problems which may also lead to a thesis.

605. Studies in Criticism. Three credit hours. Spring Quarter. Mr. Beck.

A study of the modern literary criticism, with some consideration of the historical figures whose theories have influenced present-day criticism. An effort is made to discover the principles of modern literary critics through a study of the writings in which they have set forth their theories and of the reviews in which they apply these theories.

Not open to students who have credit for English 805.

609. American Literature to the Civil War. Five credit hours. Autumn Quarter. Five class meetings each week. General prerequisites must include English 440. Mr. Pollock.

The literature of puritanism; the impact of the Enlightenment; the beginnings of American drama and fiction; the growth of a national literature; the achievements of American romanti-

cism in the work of Irving, Bryant, Whittier, Longfellow, Cooper, Hawthorne, Lowell, Holmes, Poe, Melville, Thoreau, and Emerson. Lectures, readings, reports, and discussions.

Not open to students who have credit for English 608.

610. American Literature from Whitman to the Contemporary Period. Five credit hours. Winter Quarter. Five class meetings each week. General prerequisites must include English 440. Mr. Pollock.

The transition from romanticism to realism in Whitman; American humor and ballad literature; the literature of the frontier; Mark Twain; the local colorists; the rise of realism; Howells and Henry James; the aesthetic and naturalistic revolts; the poetic revival; literary tendencies since the World War. Lectures, readings, reports, and discussions.

Not open to students who have credit for English 608.

627. History of the English Language. Three credit hours. Autumn Quarter. Lectures, quiz, and reports. Required of graduate students who elect a major in English language. Mr. McKnight.

A brief study of the English language prior to Chaucer, followed by a more detailed study of the later development of the language and the way it became standardized in grammar and vocabulary.

Especial attention is paid to the modern period, to the history of pronunciation and spelling, and the development of the rules which govern modern English usage.

Not open to students who have credit for English 427.

635. Dryden to Pope. Five credit hours. Autumn Quarter. Required of graduate students who elect Cycle III. Mr. Wilson.

The origin and development of neo-classicism with reference to French influence. Satire and controversy in Dryden, Pope, Swift, and their contemporaries. The drama of the Restoration and Queen Anne. The circle of the court of Charles II. The periodical essayists.

636. Pope to Blake. Five credit hours. Winter Quarter. Required of graduate students who elect Cycle III. Mr. Percival.

The course of the Enlightenment with reference to continental types and ideals. The breakdown of neo-classicism and the rise of romanticism. The novels of Fielding, Richardson, Sterne, and Smollett. The plays of Goldsmith, Sheridan, and others. The later poetry of Pope and of Goldsmith, Gray, Burns, and Blake.

637. Men and Manners of the Enlightenment. Five credit hours. Spring Quarter. Required of graduate students who elect Cycle III. Mr. Percival.

A study of the minds, personalities, and social backgrounds of the men who revealed themselves through letters, memoirs, autobiographies, and biographies. Pepys, Chesterfield, Johnson (through Boswell), Walpole, and Franklin.

641. The Romantic Era. Five credit hours. One Quarter. Autumn, Winter, Spring. Required of graduate students who elect Cycle IV. Mr. Percival, Mr. Newdick, Mr. Logan.

The influence of the French Revolution and the preeminence of the Romantic ideal. Wordsworth, Coleridge, Byron, Shelley, Keats, Hazlitt, Lamb, De Quincey, Scott, and Jane Austen.

Not open to students who have credit for English 441.

642. The Victorians. Five credit hours. One Quarter. Autumn, Winter. Spring. (For students majoring in English who elect Cycle IV, prerequisite, English 641.) Required of graduate students who elect Cycle IV. Mr. Beck, Mr. Logan.

The spirit and temper of the Victorian period as seen in the poetry of Tennyson and Browning, the essays of Carlyle and Ruskin, the novels of Dickens, Thackeray, and Eliot.

Not open to students who have credit for English 442.

643. Literature and Composition. Five credit hours. Spring Quarter. Three lectures with conferences on individual work each week. Special permission necessary. Mr. Snow.

Ten recent writers selected from the following: Hughes, Faulkner, Galsworthy, Conrad, Hemingway, James, Cather, Mansfield, Aldous Huxley, Cabell, Anderson, and Woolf will be read and discussed as a basis for creative and critical writing, and as illustrative of tendencies in contemporary writing. The course is primarily a composition course. Conferences on individual work.

Not open to students who have credit for English 543.

644. The Late Victorians. Five credit hours. One Quarter. Autumn, Winter, Spring. (For students majoring in English who elect Cycle IV, the

prerequisite is English 642.) Required of graduate students who elect Cycle IV. Mr. Beck, Mr. Newdick, Mr. Snow.

The transition from the Victorian to the modern period. The scientific contribution of Darwin and Huxley; the religious unrest of Arnold; the Pre-Raphaelites: Rossetti, Morris, Swinburne; the Aesthetes: Pater, Wilde; the Symbolists: Yeats; the rationalism of Meredith; the pessimism of Hardy; the tentative solutions of the pre-war moderns.

646. Middle English. Three credit hours. Winter Quarter. Required of graduate students who elect Cycle V. The general prerequisites must include English 651. Mr. Emsley.

This course deals with the transition from the highly inflected Anglo-Saxon to the comparatively free idiom of modern English; with the influence of Old-French; and with the emerging of standard English from the older dialects. The reading is done in the original with emphasis on the standard dialect.

651. Old English Prose and Poetry. Five credit hours. Autumn Quarter. Required of graduate students who elect Cycle V. Mr. Emsley.

Attempt is made to link English with the kindred Germanic languages and by means of the words and constructions of early English to explain the nature of English in use today.

***652. Early Ballads, Lyric and Drama.** Five credit hours. Autumn Quarter. Required of graduate students who elect Cycle I. Given in alternate years. Mr. McKnight.

A study of popular songs and ballads and of the first stages in the history of the English drama.

653. Chaucer and his Period. Five credit hours. Spring Quarter. Required of graduate students who elect Cycle I. Mr. McKnight.

Reading of Chaucer's principal works along with selections from the writings of Gower, Wycliffe, Langland, the Sir Gawain poet, Occleve, Lydgate, James I of Scotland, Henryson, Dunbar, Shelton, Hawes.

654. English Medieval Literature to Chaucer. Five credit hours. Winter Quarter. Given in alternate years. Required of graduate students who elect Cycle I. Mr. Utley.

A study by means of modern English renderings of epic poetry in early English and the related epic stories in other literatures, followed by a study of legends, lays, and romances. Arthurian romance is made a central feature.

655. The Novel. Five credit hours. Autumn Quarter. Mr. Hatcher.

A study of the novel, not as an historical survey, but as an individual art form through which creative minds have expressed themselves in the last century.

657. Versification. Five credit hours. Spring Quarter. Special permission necessary. Class enrollment limited to twenty-five. General prerequisites must include four Quarters of English. Mr. Graves.

The theory of verse structure with a history of the principal English verse rhythms and forms, and practice in verse composition.

658. The Short Story. Five credit hours. Winter Quarter. The general prerequisites must include a course in advanced composition. Special permission necessary. Class enrollment limited to thirty. Mr. Graves.

Lectures on structure and form in the short story, extended readings and reports, practice in story writing.

664. The Literary Revival in Ireland. Five credit hours. Autumn Quarter. Four meetings each week and a fifth at the option of the instructor. Class enrollment limited to twenty. Mr. McKnight.

Subjects for study: Ossianic literature of the eighteenth century and the modern Irish revival. Attention is paid to works by Lady Gregory, W. B. Yeats, A. E., George Moore, Fiona Macleod, J. M. Synge, James Stephens, Lennox Robinson, James Joyce, and others.

670. Recent and Contemporary Drama. Five credit hours. Spring Quarter. Four meetings each week with special reading in lieu of the fifth meeting. General prerequisites must include a course in Shakespeare. Mr. Hatcher.

The social, intellectual, and scientific forces characteristic of recent times reflected in the artistic medium of the plays of Ibsen, Strindberg, Hauptman, Wedekind, Kaiser, Toller, Chekov.

* Not given in 1936-1937.

Gorky, Andreyev, Brieux, Rostand, Maeterlinck, Vildrac, Capek, Molnar, Schnitzler, Pirandello, Benavente, Wilde, Shaw, Galsworthy, O'Casey, Milne, Howard, Rice, Barry, O'Neill, and others.

671. **Seventeenth Century Literature.** Five credit hours. Winter Quarter. Mr. Walley.

Non-dramatic literature of the later Renaissance. The growth of scientific curiosity and skepticism. The ascendancy of classical ideals. Religious reaction and Puritanism. The poetry of Milton, Donne, Jonson, Herrick, and the poets of church and court. The prose of Bacon, Burton, Browne, Walton, Bunyan, the character writers and essayists.

Not open to students who have credit for English 659.

674. **The English Renaissance.** Five credit hours. Autumn Quarter. Mr. Hatcher.

The tone and temper of the Renaissance abroad. Its development in English literature (excluding drama) from the early humanists to the death of Elizabeth; the growth of lyric poetry, the sonnets, the rise of English prose, the Tudor translations, the books of travel, the poetry of Spenser.

676. **Shakespeare.** Five credit hours. Autumn Quarter. General prerequisites must include an elementary course in Shakespeare. Mr. Walley.

A critical consideration of the art, personality, and achievement of Shakespeare in the light of Renaissance culture. Reading and interpretation of the complete works with particular attention to the major problems of Shakespearean scholarship.

677. **Elizabethan Drama.** Five credit hours. Spring Quarter. General prerequisites must include a course in Shakespeare. Mr. Wilson.

A historical and critical study of English popular drama (exclusive of Shakespeare) and of the theater from the beginning of the reign of Elizabeth to the closing of the theaters in 1642.

680. **Influence of Theater on Drama.** Three credit hours. Spring Quarter. General prerequisites must include a course in Shakespeare. English 670 is recommended. Mr. Miller.

The ways in which playhouses, actors, and audiences have influenced the work of the dramatists. Particular emphasis is placed on these factors in the development of the drama in England.

682. **Playwriting.** Five credit hours. Autumn Quarter. General prerequisites must include a course in Shakespeare and English 670. Special permission necessary. Mr. Miller.

Studies in the technique of the drama and exercises in creative writing for the theater. Particular attention is given to the one-act play. In special cases an opportunity is afforded to test original plays in actual production by the Dramatics Workshop.

Not open to students who have credit for English 822.

685. **Stagecraft.** Five credit hours. Autumn Quarter. Three hours lecture and four hours laboratory each week. Mr. Miller.

This is a practical course designed to supply the technical foundation for courses 686 and 687. It involves a study of the resources of the modern stage along with exercises in the construction and manipulation of scenery, lighting equipment, and accessories.

686. **Stage Direction.** Five credit hours. Winter Quarter. Three hours lecture and four hours laboratory each week. General prerequisites must include a course in Shakespeare and English 685; prerequisite or concurrent, English 670. Registration limited. Special permission of the instructor is necessary. Mr. Miller.

This course considers how the values of the written play are translated into terms of theatrical production. Character grouping, movement, and stage business are considered in relation to control of attention, audience-response, suspense, and climax. Opportunity is provided for some practical experience in play direction.

Not open to students who have credit for English 675.

687. **Play Production.** Five credit hours. Spring Quarter. General prerequisites must include English 686. Registration limited. Special permission of instructor is necessary. Mr. Miller.

Various theories of play production are considered and applied to a selected list of plays. Opportunity for practical work is provided in the laboratory. The course also considers the organization of the little theater groups.

Not open to students who have credit for English 679.

NOTE: TEACHING COURSES. For the Teaching Courses in this department see the Department of Education, Courses 670 and 671.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

*801. History of the Short Narrative in English. Two credit hours. Autumn Quarter. Given in alternate years. One two-hour session each week. Mr. Graves.

An historical and critical survey of short story types in English from the Middle Ages to the Twentieth Century. Individual investigation and term thesis required.

802. The Lyric. Two credit hours. Winter Quarter. Given in alternate years. One two-hour session each week. Mr. Graves.

A study of the characteristics of lyrical poetry with a history of the lyric in English literature. Individual investigations and term thesis required.

815. Advanced Reading and Study: Milton. Five credit hours. Winter Quarter. Two one-hour sessions each week. Given in alternate years. Either English 815 or 875 is required of graduate students who elect Cycle II. Mr. Parker.

*816. Advanced Reading and Study: Poetic Rhythms. Three credit hours. Spring Quarter. One two-hour session each week. Given in alternate years. Mr. Hatcher.

823. Advanced Reading and Study: The Romantic Era. Five credit hours. Autumn Quarter. Two one-hour sessions each week. Given in alternate years. Either English 823, 826, or 845 is required of graduate students who elect Cycle IV. Mr. Percival.

825. Studies in Modern English Language. Five credit hours. Spring Quarter. One two-hour session each week. Required of graduate students who elect Cycle V. General prerequisites must include English 627 or its equivalent. Mr. McKnight.

Individual topics will be assigned for study of features of modern British and American English.

Not open to students who have credit for English 810.

*826. Advanced Reading and Study: the Victorians. Five credit hours. Autumn Quarter. Two one-hour sessions each week. Given in alternate years. Either English 823, 826, or 845 is required of graduate students who elect Cycle IV.

Not open to students who have credit for English 808.

827. Advanced Reading and Study: Contemporary Literature. Five credit hours. Spring Quarter. Two one-hour sessions each week. Mr. Hatcher.

Not open to students who have credit for English 809.

835. Studies in the Age of Enlightenment. Five credit hours. Spring Quarter. Required of graduate students who elect Cycle III. Two one-hour sessions each week. Mr. Percival.

Not open to students who have credit for English 818.

845. Studies in the Age of Democracy. Five credit hours. Winter Quarter. One two-hour session each week. Given in alternate years. Either English 823, 826, or 845 is required of graduate students who elect Cycle IV. Mr. Newdick.

Not open to students who have credit for English 824.

855. Studies in the Period of Chaucer. Five credit hours. Autumn Quarter. One two-hour session each week. Required of graduate students who elect Cycle I. Prerequisite, English 653. Mr. McKnight.

Individual topics will be assigned in the study of writers and movements of the period.

Not open to students who have credit for English 811.

* Not given in 1936-1937.

865. Studies in American Literature. Five credit hours. Spring Quarter. Two one-hour sessions each week. Mr. Pollock.

Not open to students who have credit for English 814.

†875. Studies in the Renaissance. Five credit hours. Autumn Quarter. Two one-hour sessions each week. Elective, but either English 875 or 815 is required of graduate students who elect Cycle II. General prerequisites must include three courses in Cycle II or two courses in the cycle with the third concurrent or special permission of the instructor. Given in alternate years.

Individual problems.

885. Problems in Theatrical Art. Five credit hours. Winter Quarter. One two-hour period each week. Special permission of instructor required. Mr. Miller.

Research in assigned problems.

950. Research in English. Autumn, Winter, and Spring Quarters.

This course provides registration for candidates for the degree of Doctor of Philosophy in their final year. The candidate should consult the adviser in charge of his major.

PUBLIC SPEAKING

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

625. The Forms of Public Address. Five credit hours. Spring Quarter. Mr. Ketcham.

A study of the methods by which speech is made clear, vivid, and forceful including the formulation of appeals to basic human events. Practice in using these methods in the preparation and delivery of short public addresses. A broad view of language training is given with the object of increasing the student's command of thought in writing, and in conversation as well as in public speaking. Speeches are recorded phonographically to aid the student's progress.

Not open to students who have credit for Public Speaking 525.

651. Special Problems in the Theory of Public Speaking. Five credit hours. Spring Quarter. Mr. Ketcham.

Each student selects one problem for investigation. Subjects from which this selection may be made include comparative methods of preparation and delivery, special investigations in rhetorical principles and history, word analysis, criticism, appreciation, ideals and aesthetic standards in public speaking. Individual conferences.

ENTOMOLOGY

(See Zoology and Entomology)

EUROPEAN HISTORY

(See History)

FARM CROPS

(See Agronomy)

† Not given during the academic year, 1936-1937.

FINE ARTS

Office, 104 Hayes Hall

PROFESSORS HOPKINS, FANNING, PAYANT, LYNCH, BAGGS, AND ROBINSON, ASSOCIATE PROFESSOR FREY, ASSISTANT PROFESSORS RANNELLS, SHERMAN, AND GRIMES

Requirements for the degree of Master of Arts. For properly qualified students two curricula, Technical and Non-technical, are offered, each leading to the degree of Master of Arts. To receive this degree students must have at least a "B" average in forty-five credit hours of 600, 700, or 800 courses, as listed in the curricula below; must complete a satisfactory thesis as required for all candidates for the Master's degree; and must pass a comprehensive examination after the completion of course credit and the acceptance of the thesis. The thesis may be written in the historical or non-technical curriculum, or, in the technical curriculum, may consist of painting, sculpture, design, or ceramic work. In any case a written statement of the problems and solutions, with illustrations showing the results is required.

CURRICULUM IN FINE ARTS (TECHNICAL)

Fine Arts	(661) 5	Fine Arts	(662) 5	Fine Arts	(663) 5
Fine Arts	(801) 5	Fine Arts	(802) 5	Fine Arts	(803) 5
*Non-technical	5	*Non-technical	5	*Non-technical	5

*NOTE: For non-technical credit, selection may be made from the following allied courses: Fine Arts 654, 656, 670, 671, 804, 805, 806, or courses in history, literature, or philosophy approved by the adviser.

CURRICULUM IN FINE ARTS (NON-TECHNICAL)

Fine Arts	(670) 2	Fine Arts	(672 or 674) 2	Fine Arts	(654, 656, or 677) 5
Fine Arts	(671) 3	or		Fine Arts	(803) 5
Fine Arts	(801) 5	Fine Arts	(676) 3	*Fine Arts	(806) 5
*Fine Arts	(804) 5	Fine Arts	(678) 3		
		Fine Arts	(802) 5		
		*Fine Arts	(805) 5		

* With the consent of the adviser, substitutions of other graduate subjects outside the Department of Fine Arts may be made when the special interest of the student warrants it. For combination curricula the student should consult the Department of Fine Arts in regard to proper sequence of courses.

The subject of the thesis, technical or non-technical, should be filed with the department before the second term of graduate study. The faculty member under whom the major work of the student is done has charge of the thesis and should be consulted early in the program of study so that all courses may contribute to the preparation of the thesis.

Students whose general education, maturity, and experience justify it may be admitted to courses without becoming candidates for the degree and pursue subjects for which they are qualified.

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

600. The Theory and Practice of Teaching Art. Five credit hours. Winter Quarter. Five periods each week with outside laboratory assignments, observations and required readings. Miss Robinson.

A course dealing with the teaching and supervision of art in the elementary, middle and high schools.

Not open to students who have credit for Fine Arts 571.

645-646-647. Portrait Painting. Five credit hours. Autumn, Winter, and Spring Quarters. Five three-hour periods each week. Mr. Hopkins.

Painting from life. The organization and development of pictures with special reference to the delineation of character.

Not open to students who have credit for Fine Arts 545-546-547.

650. Methods and Materials of the Painter. Three credit hours. Autumn Quarter. General prerequisites must include Fine Arts 645, 646, and 647.

A study of painting materials, the composition of pigments, binders, and varnishes. A review of ancient methods of painting with a consideration of their possibilities for contemporary

use. Egg tempera, varnish tempera, under-painting, and oil glazes. Laboratory practice and lectures.

654. History of Renaissance Art. Five credit hours. Spring Quarter. Five lectures each week. Mr. Fanning.

The study of the Renaissance movement in Italy as reflected in architecture, painting, and sculpture; its influence upon other countries and its relationship to the intellectual trend from the fifteenth to the nineteenth century.

***656. History of Oriental Art.** Five credit hours. Winter Quarter. Five lectures each week. Mr. Fanning.

The study of Asiatic culture expressed by the historical development of architecture, sculpture, and painting in Persia, India, China, and Japan. Illustrated lectures, reading, and reports.

661-662-663. Advanced Technical Problems. Three to fifteen credit hours. Autumn, Winter, and Spring Quarters. Mr. Hopkins, Mr. Fanning, Mr. Payant, Mr. Frey, Mr. Lynch, Mr. Grimes, Mr. Rannells, Miss Robinson.

This course is open, by permission of the department, to students who have shown particular ability in design, drawing, painting, or sculpture and who wish to pursue advanced problems in these fields under the supervision of the department. Students in Landscape Architecture pursue special work in design and construction under these courses.

670. History of the Art of Ancient Egypt and Mesopotamia. Two credit hours. Autumn Quarter. Mr. Fanning.

The specialized study of the ancient arts of the valleys of the Nile and Tigris-Euphrates and their influence upon eastern Mediterranean culture. Lectures, discussions and presentation by each student of some special problem of research.

671. History of Hellenic Art. Three credit hours. Autumn Quarter. Mr. Fanning.

The specialized study of Greek architecture, sculpture, and painting. Lectures, round table discussions and presentation by each student of some special problems of research.

672. History of Moslem Art. Two credit hours. Winter Quarter. Alternating with Fine Arts 674. Mr. Fanning.

The study of Moslem architecture and minor arts with special attention to origins and influences. Lectures, reading, and reports.

673. History of Christian Art of the Middle Ages. Three credit hours. Winter Quarter. Mr. Fanning.

The specialized study of various phases of Romanesque and Gothic art as an expression of medieval Christianity in Italy, France, Germany, Spain, and England. Lectures, reading, discussion and reports on research topics.

***674. History of Spanish Art.** Two credit hours. Winter Quarter. Alternating with Fine Arts 672. Mr. Fanning.

The study of the architecture, sculpture, painting, and minor arts of Spain and the countries under Spanish influence. Lectures and reports.

676. History of English and American Art. Two credit hours. Winter Quarter. Miss Robinson.

A study of the work of the outstanding architects, painters, and sculptors in America as an index of the artistic trend of the eighteenth, nineteenth, and twentieth centuries. Illustrated lectures, reading, and reports.

677. History of French Art from the Beginning of the Seventeenth Century to the Present Day. Three credit hours. Spring Quarter. Alternating with Fine Arts 679. Reading knowledge of French desirable. Miss Robinson.

A specialized study of the architecture, sculpture, and painting of modern France. Illustrated lectures, reading, and reports.

680. History of Art in Germany and the Low Countries. Three credit hours. Spring Quarter. General prerequisites must include Fine Arts 451-452-453, or recommendation of the Department of German. Reading knowledge of German desirable. Mr. Fanning.

A specialized study of the architecture, sculpture, and paintings of the Germanic people and their relationship to social and political development. Lectures, reading, and reports.

Not open to students who have credit for Fine Arts 678 or 679.

* Not given in 1936-1937.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

801-802-803. Major Technical Problems. Three to fifteen credit hours. Autumn, Winter, and Spring Quarters. Mr. Hopkins, Mr. Fanning, Mr. Frey, Mr. Payant, Mr. Grimes, Mr. Baggs.

This course is open, by permission of the department, to graduate students who are qualified to do original work in ceramics, painting, or sculpture.

804-805-806. Major Historical Problems. Three to fifteen credit hours. Autumn, Winter, and Spring Quarters. Mr. Fanning, Mr. Baggs.

This course is open, by permission of the department, to graduate students who are qualified to do original research in the history of fine arts.

950. Research in Fine Arts. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the chosen field of research. The student may spend a part or all of his time on research work. Mr. Hopkins, Mr. Baggs, Mr. Fanning, Mr. Payant, Mr. Frey.

FRENCH

(See Romance Languages and Literatures)

GEOGRAPHY

Office, 213 Commerce Building

PROFESSORS HUNTINGTON, VAN CLEEF, PEATTIE, AND CARLSON, ASSOCIATE PROFESSOR SMITH, ASSISTANT PROFESSOR WRIGHT, MR. GARLAND

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

603. The Localization of Manufacturing Industries of the United States. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography or in economics. Mr. Wright.

The geography of American manufacturing. Industrial districts. Special study of representative industries as to: labor supply; sources, quantity, and value of material and power used; transportation facilities available; quantity and value of products; and problems of competition and markets.

604. Conservation and Land Utilization. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography and ten additional hours of allied subjects. Mr. Huntington.

The importance of our natural resources. The need for their conservation. Land as a natural resource and economic factor. Character and location as factors in land utilization and value. Regional and national planning for resource utilization.

Not open to students who have credit for Geography 606.

605. Geography of Ohio. Two credit hours. Winter Quarter. Two class meetings each week. General prerequisites must include elementary courses in geography and ten additional hours of allied subjects. Mr. Huntington.

Geographic influences in the history of the state. Ohio's agriculture, industries, and social conditions, together with the underlying physical, climatic, and other environmental factors that have contributed to the present development of the region.

615. Climatology. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include twenty hours in natural or social science, including geography, meteorology, or botany. Mr. Smith.

Elements of climate and their distribution. The controls of climate. Types of climate and their distribution, concluded by a consideration of the recent thought on the subject of climatic regions.

621. Geography of Europe. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Van Cleef.

The geographic factor in the economic, social, and political progress of the nations. Current major problems of the continent in the light of their geographic background.

624. Geography of Latin America. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Carlson.

Geographic regions of Mexico, Central America, the West Indies, and South America. The development of the political divisions in relation to their geographic conditions. Special emphasis is placed on the geographic analysis of Inter-American affairs.

Not open to students who have credit for Geography 623.

625. Geography of Asia. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Garland.

The major geographic regions of the continent and its insular fringe, with emphasis upon the regions of densest population. Consideration is given to interregional relationships.

631. The Historical Geography of Commerce. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. General prerequisites must include elementary courses in geography or in history. Mr. Peattie.

Geographic factors in commerce to 1800. Resources and production in the ancient and medieval world. Trade routes in relation to exchange of ideas. Geographic elements in the early origin of many present-day commercial practices.

633. The Geography of Modern Commerce. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Carlson.

Geographic factors affecting the establishment and development of modern trade routes over air, land, and water. Unequal distribution of natural resources and differences in industrial and social development as basic factors in inter-regional and international trade. Geography in market analysis.

Not open to students who have credit for Geography 632.

634. The Geography of Trade Centers. Three credit hours. One Quarter. Winter and Spring. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Van Cleef.

Geographic factors in the origin and growth of urban centers. Analysis and synthesis of the economic and physical structure and functions of trade centers in the light of their geographic setting; areal expansion; intra- and inter-trade center relations; integration with avenues of communication; occasional field trips.

651. Anthropogeography. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include courses in elementary geography or history. Mr. Peattie.

Advanced social geography. The geographic factor in cultural evolution. A course giving attention to the individual interests of students in geography, education, history, and sociology.

700. Field Work in Geography. Two credit hours. Spring Quarter. General prerequisites must include twelve hours of geography. Mr. Smith.

A course in the practice of field observation and geographic mapping.

Not open to students who have credit for Geography 641.

799. Special Problems in Geography. Two or three credit hours. Autumn, Winter, and Spring Quarters. Assigned readings, conferences, and reports. General prerequisites must include eighteen hours of geography and consent of the instructor must be obtained.

(a) Problems in Physical Geography. Mr. Peattie, Mr. Carlson, Mr. Smith.
(b) Problems in Climatology. Mr. Smith, Mr. Peattie.
(c) Problems in Political and Historical Geography. Mr. Huntington, Mr. Peattie, Mr. Van Cleef.
(d) Problems in Economic and Commercial Geography. Mr. Huntington, Mr. Van Cleef, Mr. Carlson.

Not open to students who have credit for Geography 642.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

811. History of Geography. Two credit hours. Spring Quarter. Two class meetings or lectures each week. General prerequisites must include eighteen hours of geography. Mr. Van Cleef, Mr. Peattie.

Readings in the classics. The history of the development of geographic theories. Modern tendencies as seen in current literature.

850. Seminary in Geography. Two credit hours. Not more than two seminaries to be given each Quarter. The following will be given in 1936-1937:

AUTUMN QUARTER

(a) Problems in Conservation and Land Utilization. Mr. Huntington.
(b) Problems in Foreign Commerce. Mr. Van Cleef.

WINTER QUARTER

(a) Problems in Agricultural and Industrial Geography. Mr. Carlson.
(b) Problems in Physical Geography and Cartography. Mr. Smith.

SPRING QUARTER

(a) Problems in Anthropogeography. Mr. Peattie.

950. Research in Geography. Autumn, Winter, and Spring Quarters.

Research work in historical and political geography will be conducted under the direction of Mr. Huntington and Mr. Peattie; in geography of conservation and land utilization under the direction of Mr. Huntington and Mr. Carlson; in physical geography and climatology under the direction of Mr. Peattie and Mr. Smith; in commercial and urban geography under the direction of Mr. Huntington and Mr. Van Cleef.

Conference, assigned problems, and reports.

GEOLOGY†

Offices, 103, 104 Orton Hall

PROFESSORS CARMAN AND SPIEKER, ASSOCIATE PROFESSOR STOCKDALE, ASSISTANT PROFESSOR STEWART, MR. STOUT, MR. COLE, MR. BERRY, MR. FREEMAN, MR. LAMEY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Advanced General Geology: Physiography. Five credit hours. Autumn Quarter. Four recitations and one two-hour laboratory period each week. Saturday mornings must be kept open for field trips. General prerequisites must include elementary courses in geology or geography. Mr. Cole.

A detailed study of the processes at work on the land surface and the topographic forms produced by them. This course includes practice in the interpretation of topographic maps.

Not open to students who have credit for Geology 501.

602. Advanced General Geology: Structural and Dynamic. Five credit hours. Winter Quarter. Four recitations and one two-hour laboratory period each week. General prerequisites must include Geology 601. Mr. Spieker.

A detailed study of the structural features of the earth's crust and of the forces which have produced these structures. This course includes practice in the interpretation of geological maps.

Not open to students who have credit for Geology 502.

603. Advanced General Geology: Historical. Five credit hours. Spring Quarter. Four recitations and one two-hour laboratory period each week. Saturday mornings must be kept open for field trips. General prerequisites must include Geology 602. Mr. Carman, Miss Stewart.

A study of the geological history of North America, its physical history, and life development. The course deals with the classification and distribution of the geological formations, especially those of Ohio, and with the characteristic fossils of each system.

Not open to students who have credit for Geology 503.

† For courses in mineralogy and petrography see the Department of Mineralogy.

605. Economic Geology: Metals. Five credit hours. Autumn Quarter. Five recitations or lectures each week. General prerequisites must include elementary courses in mineralogy. Mr. Freeman.

A study of the nature of ores, their classification and origin; the metallic deposits.

606. Economic Geology: Non-Metals. Three credit hours. Winter Quarter. Three recitations or lectures each week. General prerequisites must include elementary courses in mineralogy. Mr. Freeman.

A study of the non-metallic deposits including coal, with special emphasis on the coals of Ohio.

607. Economic Geology: Petroleum. Three credit hours. Spring Quarter. Three recitations or lectures each week. General prerequisites must include elementary courses in mineralogy. Mr. Freeman.

A study of petroleum, natural gas, and the solid bitumens; their origin, geological relations, and distribution.

***608. Stratigraphic Geology of Ohio.** Five credit hours. Autumn Quarter. Given in alternate years. Permission of the instructor must be obtained. Mr. Carman.

Field trips with reports, lectures, and assigned readings. Field trips on Saturdays (entire day) while the weather permits.

The geological formations of Ohio are studied in the field, by rock specimens, and by assigned readings. This course is intended to acquaint the student with the rock formations of Ohio.

***609. Petrology.** Five credit hours. Winter Quarter. Four recitations and one two-hour laboratory period each week. Given in alternate years. General prerequisites must include elementary courses in mineralogy. Mr. Lamey, Mr. Freeman.

A study of the origin, mode of formation, and geologic relations of rocks, with laboratory study in rock identification.

610. Physiography of the United States. Five credit hours. Winter Quarter. Given in alternate years. General prerequisites must include a course in physiography. Mr. Cole.

A study of the physiographic regions of the United States. The topographic form and physiographic history with the geologic history as a background. Designed to give the student of geology or geography a working knowledge of the physiography of the United States.

612. Special Problems. Three to five credit hours. All Quarters. Assigned readings, conferences, and reports.

A study of special topics by conferences and reports. Laboratory, library or field work.

Properly qualified students may carry on work in stratigraphy, sedimentation, structural geology, economic geology, petrology, opaque ore mineral studies, paleontology and physiography under the direction of the appropriate members of the department.

615. Geological Surveying. Five credit hours. Spring Quarter. Two recitations and three field or laboratory periods each week. Given in alternate years. Students intending to elect this course should consult the instructor. Class limited to eight. Mr. Stockdale.

A study of the construction and interpretation of topographic and geologic maps, with special emphasis on instrument and map work in connection with oil surveying. Field practice in various methods of triangulation, traversing, and topographic sketching. Instruments used include plane table, telescopic alidade, open sight alidade, aneroid barometer, hand level, stadia, and compass.

616. Clays. Five credit hours. Winter Quarter. Recitations, lectures, and assigned readings. General prerequisites must include a course in chemistry. Mr. Stout.

The properties, distribution, uses, and origin of clays. Emphasis will be given to the clays of Ohio.

620. Introductory Paleontology. Three credit hours. Autumn Quarter. Two recitations and one two-hour laboratory period each week. General pre-

* Not given in 1936-1937.

requisites must include a course in historical geology. Mr. Carman, Miss Stewart.

A study of the systematic classification of the animal kingdom as a means of becoming acquainted with the faunas that characterize the various geological formations. The course deals mainly with the generic characters of the fossil invertebrates and their use in identifying and correlating geological formations.

621. **Introductory Paleontology.** Three credit hours. Winter Quarter. Mr. Carman, Miss Stewart.

A continuation of Geology 620.

622. **Introductory Paleontology.** Three credit hours. Spring Quarter. Mr. Carman, Miss Stewart.

A continuation of Geology 621 but this course deals largely with the fossil vertebrates.

*623. **Micro-Paleontology.** Three credit hours. Spring Quarter. Laboratory work. Given in alternate years. General prerequisites must include Geology 620-621-622. Mr. Berry, Miss Stewart.

A study of fossil micro-organisms, especially the foraminifera.

627. **Field Geology.** Eight credit hours. Summer Quarter. First term. General prerequisites must include Geology 601-602-603 or equivalent. Permission of the instructor must be obtained. Limited to men. Mr. Stockdale.

This course offers training in the standard methods of geologic field work. It is conducted from a fixed field camp at Cumberland Spring, near Dayton, Tennessee, and employs the entire time of the students. The field for study is the Appalachian region of eastern Tennessee, which offers considerable variety in physiographic, stratigraphic, structural, and economic geology. The course begins about June 15 and continues five weeks, after which a report will be prepared by each student and submitted by the following December first.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

If the student intends to specialize in paleontology he must have had in addition courses in zoology; if in inorganic geology, courses in chemistry, physics and mineralogy; if in physiography, courses in physics and chemistry.

801-802-803. **Advanced Historical Geology.** Three credit hours. Autumn, Winter, and Spring Quarters. Lectures and laboratory. Mr. Carman, Mr. Spieker.

A study of the physical history of the North American continent and of the life development which has taken place upon it. The lithology, subdivisions, geographical distribution, and fossils of each system are studied and from these the geological history of the time is interpreted.

807. **Advanced Paleontology.** Three or four credit hours each Quarter. Autumn, Winter, and Spring Quarters. A student may enter at the beginning of any Quarter. General prerequisites must include Geology 620, 621, and 622. Miss Stewart, Mr. Carman.

The identification and study of typical faunas from various geologic formations, with particular reference to those of Ohio. The work is individual and conducted as a laboratory course with conferences with the instructor in charge.

*810. **Geology of the Eastern United States.** Three credit hours. Winter Quarter. Lectures, readings, conferences. General prerequisites must include acceptable courses in historical and structural geology. Mr. Carman.

A review of the important stratigraphic and structural features of the Eastern United States. Special attention is given to the correlation of the important formations, the major structures and the geological history of the regions studied.

*811. **Geology of the Western United States.** Three credit hours. Spring Quarter. Lectures, readings, conferences. General prerequisites must include acceptable courses in historical and structural geology. Mr. Spieker.

A review of the important stratigraphic and structural features of the Western United States, as exemplified by the Cordilleran region. Special attention is given to the correlation of the important formations, the major structures, and the paleogeography of the region.

* Not given in 1936-1937.

*812. **Principles of Sedimentation and Stratigraphy.** Five credit hours. Spring Quarter. General prerequisites must include courses in advanced general geology. Four lectures and one conference each week. Mr. Spieker.

The origin, constitution, and relationships of stratified rocks; an approach to the outstanding problems of stratigraphy, in which attention is given chiefly to processes of sedimentation and their results, the interpretative study of sedimentary rocks, and the general problems of correlation.

Not open to students who have credit for Geology 618.

815. **Seminary in Metamorphic Geology.** Two credit hours. Autumn Quarter. General prerequisites must include Geology 609. Mr. Freeman.

A study of the processes of metamorphism, with a critical analysis of the rock types produced.

816. **Seminary in Structural Geology.** Two credit hours. Winter Quarter. Mr. Spieker.

Conferences for the discussion of problems in geologic structure as exemplified and developed in selected mountain regions.

817. **Seminary in Earth Tectonics.** Two credit hours. Spring Quarter. Mr. Spieker.

Conferences covering the broader and more fundamental problems of earth structure, involving chiefly the nature and origin of crustal forces.

950. **Research in Geology.** Autumn, Winter, and Spring Quarters. Field, laboratory and library study. General prerequisites must include acceptable courses in the field chosen. Consent of the instructor must be obtained.

Research in stratigraphy and structural geology is conducted under the supervision of Mr. Carman, Mr. Spieker, and Mr. Stockdale; in paleontology under Mr. Carman, Miss Stewart, and Mr. Berry; in sedimentation under Mr. Spieker; in economic geology and petrology under Mr. Freeman; and in physiography under Mr. Cole.

GERMAN

Office, 210 Derby Hall

PROFESSORS EVANS, EISENLOHR (EMERITUS), MAHR, AND SPERBER, ASSISTANT PROFESSORS THOMAS (EMERITUS), AND GAUSEWITZ, MR. NORDSIECK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Proseminary: Eighteenth and Nineteenth Century Literature. Three credit hours. Autumn, Winter, and Spring Quarters. Three hours lecture and quiz each week.

622. Autumn Quarter, 1936. Schiller: Life and Works. Mr. Evans.

623. Winter Quarter, 1937. Kleist: Life and Works. Mr. Gausewitz.

624. Spring Quarter, 1937. Hebbel: Life and Works. Mr. Mahr.

655. **German Phonetics.** Three credit hours. Spring Quarter. Three hours lecture and drill each week. General prerequisites must include six Quarters of German or equivalent. Mr. Sperber.

A study of the standard of German pronunciation and its chief variations. Introduction to historical study of the German language.

673. **Middle High German.** Three credit hours. Winter Quarter. Mr. Sperber.

Introduction to the morphology and syntax of Middle High German. Reading of selections from the Nibelungenlied and Walther von der Vogelweide.

675. **The German Language.** Three credit hours. Spring Quarter. Three hours lecture and quiz each week. Mr. Sperber.

The study of texts illustrating the history of the German language.

* Not given in 1936-1937.

685. Advanced Composition. Three credit hours. Spring Quarter. Three hours lecture and quiz each week. General prerequisites must include acceptable courses in German composition. Mr. Mahr.

An advanced course in speaking and writing German, accompanied by a review of German syntax.

695. Special Problems. Two to ten credit hours. Autumn, Winter, and Spring Quarters. Mr. Evans, Mr. Mahr, Mr. Gausewitz.

Investigations of minor problems in the various fields of German literature and philology.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 690.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

*801. Advanced Middle High German. Three credit hours.

*805. Gothic. Three credit hours. Autumn Quarter. Mr. Sperber.

*810. Old High German. Three credit hours. Winter Quarter. Mr. Sperber.

860. Seminary in German Literature. Five credit hours. Autumn, Winter, and Spring Quarters.

Autumn Quarter, 1936. German Lyrics and Lyric Forms. Mr. Gausewitz.

Winter Quarter, 1937. Grillparzer. Mr. Mahr.

Spring Quarter, 1937. Goethe's Dramas. Mr. Evans.

950. Research in German. Autumn, Winter, and Spring Quarters. Mr. Evans, Mr. Eisenlohr, Mr. Mahr, Mr. Gausewitz.

GREEK LANGUAGE AND LITERATURE

(See Classical Languages and Literature)

HISTORY

Office, 207 University Hall

PROFESSORS WITTKE, SIEBERT (EMERITUS RESEARCH), McNEAL, HOCKETT, WASHBURNE, DORN, HILL, ROBINSON, AND McDONALD, ASSISTANT PROFESSORS ROSEBOOM, WEISENBURGER, AND SIMMS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include at least four Quarters in the social science field, of which at least two must be in history.

607. The Renaissance. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Dorn.

The Renaissance primarily as an Italian movement. The political evolution of the Italian communes into city republics, with special emphasis on Florence, Milan, Venice, Genoa, and Rome; early capitalism and industrial and commercial movements; an analysis of the culture, art, science, and literature of the Renaissance and their influence upon the Church, the Papacy, and modern modes of thought and behavior. Lectures, readings, reports, and discussions.

608. The Reformation. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Dorn.

The Church and European society in the later Middle Ages; culture and thought in the age of the Reformation; the rise of the European state system; Luther and the German National

* Not given in 1936-1937.

movement; Zwingli and Switzerland; Calvin; the expansion of Protestantism in Europe; and the relation of the Reformation to medieval and modern civilization. Lectures, readings, reports, and discussions.

611. **Constitutional History of England to 1485.** Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include a major in history. Mr. Robinson.

The origin and development of English legal institutions and government. Textbook, lectures, collateral readings, and discussions.

612. **Constitutional History of England since 1485.** Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include a major in history. Mr. Robinson.

A continuation of History 611. Special emphasis will be given to the evolution of parliamentary government, constitutional liberties, the cabinet and party system, Catholic emancipation, electoral reform, the Irish question, and the rise of democracy. Textbook, lectures, collateral readings, and discussions.

*613. **England in the Tudor Period.** Three credit hours. Three class meetings each week. Advanced students from other departments admitted only with the consent of the instructor. Mr. Robinson.

An intensive study of England in the period of transition, emphasizing social and political conditions, together with a brief survey of contemporary Europe. Some attention will be given to the source material of the period. Lectures, readings, reports, and discussions.

*614. **England in the Stuart Period.** Three credit hours. Three class meetings each week. Advanced students from other departments admitted only with the consent of the instructor. Mr. Robinson.

An intensive study of England in the seventeenth century emphasizing social and political conditions, and England's relations with Europe and North America. Some attention will be given to the source material of the period. Lectures, readings, reports, and discussions.

615. **Nineteenth Century England (1815-1885).** Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include History 422, or a major in History. Advanced students from other departments without this prerequisite admitted on consent of the instructor. Mr. Robinson.

The Reform Era and the Mid-Victorian decades, with special emphasis on the internal situation, and social, cultural, and economic changes. Lectures, readings, reports, and discussions.

616. **Modern Britain since 1885.** Three credit hours. Spring Quarter. Three class meetings each week. Prerequisite, same as for History 615. Mr. Robinson.

The social structure of Modern Britain; the growth of democracy; the rise of the Labor party; Irish affairs, and the effects of the War. Lectures, readings, reports, and discussions.

*617. **The Absolute Monarchy (1650-1789).** Three credit hours. Spring Quarter. Three class meetings each week. Mr. Dorn.

This course offers a study of the transformation of feudal society into the modern absolute state in its social, economic and constitutional aspects, as exemplified in France, Spain, Austria, Prussia, and Russia. Special emphasis will be placed on France under Louis XIV, on the evolution of Prussia and Russia, the changing diplomatic alignments of the principal European Powers from 1660 to 1789, on the intellectual enlightenment of the eighteenth century and Enlightened Despotism. Readings, discussions, and reports.

619. **Medieval Civilization.** Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include a major in history. Advanced students from other departments without this prerequisite admitted only with consent of the instructor. Mr. McNeal.

The formation of feudal society; culture of castle and court; the rise of towns and their social and economic life; the evolution of the Medieval Church and its educational and artistic contributions. Lectures, readings, problems, and class discussion.

621. **Expansion of Europe to 1588.** Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include a major in

* Not given in 1936-1937.

history. Advanced students from other departments admitted only with the consent of the instructor. Mr. Washburne.

A study of the early geographical ideas of the Europeans, their first contact with the outside world, the period of discovery, the creation of the Portuguese empire in the east and the Spanish monopoly in the west, to the collapse of the Iberian control of European expansion by the destruction of the Armada in 1588. Lectures, readings, and discussions.

622. Expansion of Europe from 1588 to 1815. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include a major in history. Mr. Washburne.

A study of the rise of the chartered trade companies, the ascendency of the Dutch, the contest between the Dutch and the English for commercial supremacy and the long struggle between the English and the French for maritime supremacy, with its resultant effects upon India and North America through the settlement at the end of the Napoleonic era. Lectures, readings, and discussions.

623. Expansion of Europe from 1815 to the Present. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include a major in history. Mr. Washburne.

A study of the problems of expansion in the nineteenth and twentieth centuries; the development of India; the movement into the Southern Pacific; the partition of Africa and the various phases of modern imperialism after 1876, through the readjustment of territory under the mandate system after the World War. Lectures, readings, and discussions.

624. The French Revolution and Napoleon. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include a major in history. Advanced students from other departments admitted only with the consent of the instructor. Mr. McNeal.

625. The Third French Republic. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include a major in history. Mr. McNeal.

628. Contemporary Europe (1919-1936). Three credit hours. Spring Quarter. Three class meetings each week. Mr. Washburne.

A study of present-day problems. A consideration of the phases of the attempted reconstruction of Europe following the Paris Conference of 1919. This includes the issues involved in the subjects of post-war diplomacy, reparations, disarmament, the new constitutions of Europe, the appearance of communism and fascism and the European attitude toward the changing situations in the Near and Far East.

629. Modern Germany (1789-1918). Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include elementary history courses. Advanced students from other departments without these prerequisites must obtain the consent of the instructor. Mr. Dorn.

Introductory lectures on the basic problems and tendencies of German history; Germany and the French Revolution; German Enlightenment and Romanticism and their relation to political thought; the Stein-Hardenberg reforms and the war of liberation; Prussia, Austria and the problem of German unity; the nationalist and democratic movements; the Bismarckian Empire; industrial development; William II and the World War; the German Revolution of 1918. Lectures, readings, reports, and discussions.

630. The Diplomacy of Europe (1878-1919). Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include a major in history. Advanced students from other departments admitted only with the consent of the instructor. Mr. Washburne.

A study with the use of the new material now available, of the diplomatic obligations of the European states from the Congress of Berlin of 1878 to the Paris Conference of 1919; the formation of alliances, the crises which culminated in the war, and the attitude of European leaders. Lectures, readings, and discussions.

631. Constitutional History of the United States to 1837. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hockett.

The purpose of this course, together with History 632, is to exhibit the growth of our constitutional system in its genetic aspects, as the product of vital social forces. Lectures, discussions, and reports.

632. Constitutional History since 1837. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hockett.

A continuation of History 631.

633. The Slavery Controversy in the United States. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Simms.

The ante-bellum South and its destruction; the Civil War in the light of the forces which tended to hasten or obstruct the clash of arms. Lectures, readings, and discussions.

634. Reconstruction and the New South (1863-1925). Three credit hours. Spring Quarter. Three class meetings each week. Mr. Simms.

The aftermath of the slavery struggle as traced in the reconstruction of the Southern States and in the readjustment of society and of the states to the new status of the Negro, and to the economic forces of the last half century. Lectures, readings, reports, and discussions.

635. American Diplomacy to the Close of the Civil War. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hill.

The foreign relations of the United States, beginning with the diplomacy which resulted in the establishment of independence and including such subjects as the struggle for neutral rights and commercial recognition, the extension of territory on the continent, the origin of the Monroe Doctrine, and the international controversies of the Civil War. Lectures, discussions, and reports.

636. American Diplomacy since the Civil War. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hill.

Problems in the diplomacy of the United States resulting from the Civil War, the development of the Monroe Doctrine, the acquisition of dependencies, relations with Latin America and the Orient, arbitration, the Isthmian Canal, and neutral rights during the Great War in Europe. Lectures, discussions, and reports.

637. Recent History of the United States (1875-1936). Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Wittke.

An intensive study, by the topical method, of political, constitutional, industrial, and social problems during the last fifty years. Among the topics to be considered are the economic revolution; the rehabilitation of the South; the transformation of the West; agrarian unrest; third party movements; money and banking, and the tariff. Lectures, text-book, collateral readings, and discussions.

638. Recent History of the United States (1875-1936). Three credit hours. Winter Quarter. Three class meetings each week. Mr. Wittke.

This course is the natural continuation of History 637, but may be taken separately. Among the topics to be considered are: the rise of capitalistic combinations; transportation problems; the labor movement; the women's movement; immigration; the trend of political reform; the foreign contacts of the United States; the problems of reconstruction after the World War; "The New Deal." Lectures, textbook, collateral readings, and discussions.

†639. The Influence of Immigrant Groups upon United States History. Five credit hours. Five class meetings each week. Mr. Wittke.

The share of different immigrant groups in the building of the nation, from the colonial period to the present; with special emphasis on the influence of immigration upon American political, economic, social, and cultural development. Lectures, readings, and discussions.

640. The Pioneer in American History to 1812. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hockett.

This course, together with History 641, follows the expansion of settlement westward from the Atlantic coast, picturing the life of the pioneers and the rise of new communities, and tracing their influence upon national development. Lectures, discussions and reports.

641. The Pioneer in American History since 1812. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hockett.

A continuation of History 640.

643. Political Parties in the United States. Five credit hours. Spring Quarter. Five class meetings each week. Mr. Roseboom.

The radical part of the Revolution; the origin and growth of national parties; the slavery issue in party politics; the effect of the Civil War upon parties; party development in recent American history, special attention being devoted to the influence of the new economic and social conditions in creating new parties and policies. Lectures, readings, discussions, and reports.

644. The Colonization of North America. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Roseboom.

A survey of the transplanting of European culture and institutions to North America. Colonizing methods of the leading colonial powers will be considered as well as the expansion of

† Not given during the academic year, 1936-1937.

their colonies and the resulting international struggle for supremacy, with special emphasis upon English colonization and institutional development. Lectures, readings, reports, and discussions.

645. Latin America. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hill.

The European background; native cultures of the New World; conquest and settlement; political, social, and economic institutions; the wars for independence. This course affords a natural introduction to History 646. Lectures, readings, and discussions.

646. Latin America. Five credit hours. Winter Quarter. Five class meetings each week. Mr. Hill.

The evolution of the A B C powers and Mexico, with minor consideration of the other republics; major problems of an inter-American and an international nature. This course is a logical continuation of History 645. Lectures, readings, and discussions.

†647. History of Canada. Five credit hours. Five class meetings each week. Mr. Wittke.

An intensive study of Canadian history with special emphasis on the relations of Canada with the United States and with the mother country, and the comparison of Canadian institutions and problems with our own. Lectures, textbook, collateral readings, and discussions.

See page 46 for the program in Ancient History and Literature.

649. Greek Civilization. Three credit hours. Spring Quarter. Three class meetings each week. Mr. McDonald.

A study of the contributions of Greece to Western civilization; political institutions, law, religion, drama, literature, science, and philosophy. Lectures, readings, and discussions.

650. Roman Civilization. Three credit hours. Winter Quarter. Three class meetings each week. Mr. McDonald.

A study of Roman contributions to Western civilization; political institutions, Roman law, religions in the Roman Empire with special reference to Christianity, slavery, agriculture, economic life, etc. Lectures, readings, and discussions.

653. The Ancient History of the Near East. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. McDonald.

A survey of the history of Egypt, Sumer, Akkad, Babylon, and Assyria. Lectures, readings, and reports.

654. The Age of the Crusades. Three credit hours. Winter Quarter. Three class meetings each week. Advanced students from other departments admitted only with the permission of the instructor. Mr. McNeal.

Conditions in western Europe preceding the First Crusade, influence of the early crusading movement on the development of western Europe in the twelfth century, contemporary accounts of the Crusades. Readings, lectures, and reports on contemporary sources.

655. Greek History. Five credit hours. Winter Quarter. Five class meetings each week. Mr. McDonald.

An intensive study of Greece, with a brief introductory survey of the ancient civilization of the Near East. Lectures, readings, reports, and discussions.

656. Roman History. Five credit hours. Spring Quarter. Five class meetings each week. Mr. McDonald.

This course is the natural continuation of History 655. Lectures, readings, reports, and discussions.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 678.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include acceptable foundation courses of collegiate grade in European and American history, economics and political science.

General Examination. For the purposes of the general examination, required of all students who wish to be admitted to candidacy for the Ph.D. degree, the subject of history is divided as follows:

† Not given during the academic year, 1936-1937.

DIVISION I

(1) Greek History.
(2) Roman History.
(3) Political and Institutional History of the Middle Ages.
(4) History of Continental Europe, 1300-1648.
(5) English History to 1485.

DIVISION II

(1) English History since 1485.
(2) History of Continental Europe, 1648-1871.
(3) History of Continental Europe since 1871.
(4) History of North America and the United States to 1789.
(5) History of the United States, 1789-1876.
(6) History of the United States since 1876.

DIVISION III

(1) The Expansion of Europe.
(2) The Far East.
(3) The Near East.
(4) Latin-America.
(5) Canada.

In the General Examination, every candidate will be required to pass an oral and written examination on five of the above fields (excluding the one in which his dissertation falls which will be reserved for the final departmental examination). In defining these five fields, the candidate must select three from either Division I or II, and may select one from Division III. In no case may all be selected from one division only. The general examination must be taken not later than the middle of the second Quarter before the Quarter in which the student hopes to take his degree.

It is not intended that the mere taking of courses shall be an adequate preparation for this examination. The candidate will be expected to show a knowledge of each chosen *field as a whole*, and in addition the power of organization and interpretation which is essential to the pursuit of independent research. A reasonable knowledge of the literature of each field is likewise expected. Consultation with an instructor in each field will assist in intelligent preparation for this examination.

A sixth field, chosen from the above Division, to be designated as the field of the dissertation, will be made the subject of an intensive written test in the Final Examination. With the approval of the committee in charge of the General Examination, the field of the dissertation may be a definite portion of one of the fields listed in the Divisions. This written test will be followed by the Final Oral Examination. At the time of the Final Examination will be given also such written or oral tests as may be deemed necessary on such courses in other departments as may have been included in the approved courses of study. These will normally lie in the other social sciences but may for sufficient reasons be offerings in philosophy, language, literature, or other properly correlated subjects.

All candidates for the Master's degree are required to take at least two Seminaries in History, under ordinary conditions, one in American History and one in European History.

All candidates for the degree of Doctor of Philosophy are required to take at least four Seminaries in History, of which two must be in the field of American History and two in the field of European History.

As indicated by the courses in the following announcement, the University offers a large opportunity for graduate work in history. The University Library contains about 25,000 volumes on history and about 10,000 additional volumes in parliamentary, congressional, and other records. Students have access also to large collections in the field of history in other libraries in the city, such as the State Library and the Library of the State Historical Society.

812. Introduction to Historical Research. Three credit hours. Autumn Quarter. Three class meetings each week. Required of candidates for the Master's degree. Mr. Hockett.

A practice course dealing with the problems involved in the preparation of the Master's thesis. Should be taken during the student's first Quarter in the Graduate School.

813. Great European Historians. Two credit hours. Winter Quarter. Required of candidates for the Doctor's degree. Mr. Dorn.

A study of the leading historical writers and schools of Europe, with selected readings from representative writers.

†814. **Great American Historians.** Two credit hours. General prerequisites must include History 813. Required of candidates for the Doctor's degree. Mr. Hockett.

A study of the leading American writers and schools of history.

Not open to students who have credit for History 652.

815. **Seminary in European History.** Three credit hours. Autumn Quarter. History 812 must be included in the general prerequisites or must be taken concurrently. Mr. Washburne.

A practice course in research. Problem: English Attitude concerning the Balkans, 1909-1912.

816. **Seminary in European History.** Three credit hours. Winter Quarter. History 812 must be included in the general prerequisites or must be taken concurrently. Mr. Dorn.

A practice course in research. Problem: Toynbee's, The Study of History.

817. **Seminary in European History.** Three credit hours. Spring Quarter. History 812 must be included in the general prerequisites or must be taken concurrently. Mr. Robinson.

A practice course in research. Problem: Problems in the History of Nineteenth Century England.

819. **Seminary in American History.** Three credit hours. Autumn Quarter. History 812 must be included in the general prerequisites or must be taken concurrently. Mr. Hill.

A practice course in research. Problem: United States' Latin-American Relations.

820. **Seminary in American History.** Three credit hours. Winter Quarter. History 812 must be included in the general prerequisites or must be taken concurrently. Mr. Wittke.

A practice course in research. Problem: Problems in Recent United States History.

821. **Seminary in American History.** Three credit hours. Spring Quarter. History 812 must be included in the general prerequisites or must be taken concurrently. Mr. Roseboom.

A practice course in research. Problem: Problems in Ohio History.

950. **Research in History.** Autumn, Winter, and Spring Quarters. Open by permission of the chairman of the department.

Qualified graduate students who wish to do research with the advice of members of the staff of the Department of History may register for this course.

HISTORY OF EDUCATION

(See Education)

HOME ECONOMICS

Office, 220 Campbell Hall

PROFESSORS GORRELL AND McKAY, ASSISTANT PROFESSORS KENNEDY, PRESSEY, TURNBULL, BANCROFT, HUSTON, MORGAN, DAVIS, GRIFFITH, AND HUGHES, MISS RYAN, MISS HEINER, MISS JONES, MISS DICKSON, MISS KING

In cooperation with the University Hospital, an opportunity is given for dietitian internes to schedule a sequence leading to the Master's degree. Candidates for appointment as student internes should be graduates of the four-year course of a recognized Home Economics department with a major in foods and nutrition or institution management.

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. **Clothing.** Three or five credit hours. One Quarter. Autumn, Winter, Spring. Three or five two-hour periods for class discussion and laboratory

† Not given during the academic year, 1936-1937.

each week. General prerequisites must include an elementary course in clothing. Miss Heiner, Miss Ryan.

Application of principles of color, line, and texture to costume. Various types of fabrics are used in draping.

602. Textiles. Three credit hours. Winter Quarter. Two lectures and one three-hour laboratory period each week. Miss Griffith.

A study of methods of fabric analysis including microscopic, chemical, and physical tests. Discussion of recent developments in the field of textiles. Application is made to the selection of fabrics.

†604. Clothing. Three credit hours. General prerequisites must include Home Economics 503, experience in teaching clothing or consent of instructor is required. Miss Ryan.

A course in clothing selection and construction planned to meet the needs of teachers who wish to acquire a knowledge of the recent developments in this field.

611. Nutrition. Five credit hours. One Quarter. Autumn, Winter, Spring. Three meetings for class discussion and two two-hour laboratory periods each week. General prerequisites must include fundamental courses in physiology and agricultural chemistry. Miss McKay.

A study of the fundamental principles of human nutrition and their application to the feeding of individuals and groups under varying physiological and economic conditions.

612. Nutrition. Five credit hours. Spring Quarter. Three two-hour periods each week for class discussion and laboratory; other hours to be arranged. General prerequisites must include Home Economics 611. Miss McKay.

Experience in the use of current literature as a means of following the development of modern concepts of nutrition. Problems of feeding in connection with overweight, underweight, and other abnormal conditions in which diet is an important part of the treatment.

614. Foods. Three or five credit hours. One Quarter. Autumn and Winter. Students who register for five credit hours will have three meetings for discussion and two three-hour laboratory periods each week. Students who register for three hours will have two meetings for discussion and one three-hour laboratory period. Miss McKay, Miss Hughes, Miss Dickson, Mrs. Kennedy.

This course considers problems concerning the purchase of food and the planning and preparation of meals.

619. Household Equipment. Three credit hours. Winter Quarter. Two hours for class discussion and one two-hour laboratory period each week. Miss Davis.

A study of recent developments in the field of household equipment. Special consideration of the principles of selection and of the problems which arise in actual use.

621. Child Development. Five credit hours. One Quarter. Autumn, Winter, Spring. Four meetings for class discussion each week; three morning hours to be arranged for laboratory. General prerequisites must include a course in psychology and in sociology or education. Students not majoring in home economics may by consent of instructor substitute other courses for the home economics courses as prerequisites. Miss Morgan, Miss Jones.

The nature, development, care and training of the child, and the responsibility of society for providing for the physical, mental, and social needs of the child. The Home Economics Nursery School affords an opportunity for observation and for experience with children.

626. Principles of Home Management. Three credit hours. One Quarter. Autumn, Winter, Spring. Three periods each week for class discussion. General prerequisites must include Home Economics 611 and elementary courses in economics. Mrs. Gorrell, Miss Turnbull, and others.

A study of the management of the various resources available to the family, with a view to securing well-being and satisfaction for the members.

627. Laboratory in Home Management. Four credit hours. One Quarter. Autumn, Winter, Spring. One conference each week and laboratory to be

† Not given during the academic year, 1936-1937.

arranged. General prerequisites must include Home Economics 611 and 626 or consent of the instructor. Miss Morgan and others.

An application of the principles presented in other courses. Each student is provided with an opportunity to study the management of one or more homes, the needs of the student being considered.

†628. **Selection of Furnishings for the Home.** Three credit hours. Field trips to be arranged.

A study of the consumers' problems in the selection of home furnishings. Field work is arranged with retail merchants.

630. **The Purchase of Foods for Institutions.** Three credit hours. One Quarter. Autumn and Winter. One lecture and two two-hour laboratory periods each week. General prerequsites must include Home Economics 611, 614, and elementary courses in economics. Mrs. Kennedy.

A study of purchasing food on a large quantity basis. Marketing practices studied from the standpoint of buying for institutions.

631. **Institutional Cookery and Equipment.** Five credit hours. One Quarter. Autumn and Winter. Hours for discussion and laboratory to be arranged. General prerequisites must include a course in engineering drawing. Concurrent, Home Economics 630 and 632. Mrs. Kennedy.

Application of principles of cookery to large quantity preparation. A study of standardized formulas, calculation of food costs, the construction, operation and use of equipment, the writing of specifications, and the drawing of floor plans.

632. **Institution Organization and Administration.** Five credit hours. One Quarter. Autumn and Winter. Hours to be arranged. Concurrent, Home Economics 630 and 631. Mrs. Kennedy.

A study of the principles of organization and management applied to the problems of housing and feeding institution groups. Supervised experience in club service and cafeteria management.

633. **School Lunchroom Management.** Three credit hours. Spring Quarter. One lecture and four laboratory hours each week. Home Economics 611 must be included in the general prerequisites or taken concurrently. Mrs. Kennedy.

This course is arranged for those who wish to be prepared to manage school lunch-rooms in connection with their teaching. It consists of a survey of equipment, organization, and management, with observations in school lunchrooms.

†635. **Foods.** Three credit hours. General prerequisites must include Home Economics 611 or consent of instructor. Miss Hughes.

This course considers the recent important contributions of research relative to the preparation and preservation of foods.

†644. **The Teaching of Home Economics.** Three credit hours. Three meetings each week for class discussion.

The consideration of the problems of the experienced home economics teacher, discussion centering around the solution of these problems in the light of modern educational theories and practices.

701. **Special Problems in Home Economics.** Three to fifteen credit hours for one Quarter or more. To be given in units of three or five hours. Autumn, Winter, Spring. One conference or more each week.

Problems in various phases of home economics chosen for individual study. Groups will be organized as follows:

(a) Problems in food preparation. Autumn and Winter Quarters. Miss Dickson, Miss Hughes.
(b) Problems in nutrition and dietectics. Autumn, Winter, Spring. Miss McKay.
(c) Problems in textiles. Winter and Spring Quarters. Miss Griffith.
(d) Problems in clothing. Autumn and Spring Quarters. Miss Ryan.
(e) Problems in home furnishing. Winter and Spring Quarters.
(f) Problems in household equipment. Winter and Spring Quarters. Miss Davis.
(g) Problems in home management. Autumn, Winter, Spring. Mrs. Gorrell, Miss Morgan.
(h) Problems in institution management, equipment, and food buying. Spring Quarter. Mrs. Kennedy.
(i) Problems in teaching home economics. Winter and Spring Quarters. Mrs. Pressey.
(j) Problems in child development. Autumn, Winter, Spring. Miss Morgan.

† Not given during the academic year, 1936-1937.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

†802. **Seminary in Home Economics Teaching.** Three to five credit hours. Home Economics 644 must be included in the general prerequisites or taken concurrently. Consent of the instructor must be obtained. Mrs. Pressey, Miss Huston.

A study of content, methods, and administration of home economics teaching.

803. **Seminary in Foods and Nutrition.** Three credit hours. One Quarter. Autumn and Winter. General prerequisites must include the consent of instructor. Miss McKay and others.

Conferences and reports on topics in foods and nutrition.

950. **Research in Home Economics.** Autumn, Winter, and Spring Quarters. Mrs. Gorrell, Miss McKay, Mrs. Pressey, Mrs. Kennedy, Miss Morgan, Miss Turnbull, Miss Griffith, Miss Davis, Miss Hughes.

Investigational work bearing upon the problems of living, either in the home, the institution or under commercial conditions.

HORTICULTURE AND FORESTRY

Office, 118 Horticulture and Forestry Building

PROFESSORS GOURLEY, PADDOCK, BROWN, AND LAURIE, ASSOCIATE PROFESSOR WIESEHUEGEL, ASSISTANT PROFESSORS CHADWICK AND HOWLETT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include acceptable courses in pomology, vegetable gardening, floriculture and forestry.

601. **Horticultural Plant Breeding.** Three credit hours. Winter Quarter. Three recitations each week. Given in alternate years. Mr. Laurie, Mr. Brown.

A study of the methods of breeding of horticultural crops; the modification and improvement of plants under cultivation, together with a discussion of the theories of heredity.

602. **Experimental Horticulture.** Three credit hours. Autumn Quarter. One discussion period and six hours of laboratory work each week. Botany 605 must be included in the general prerequisites or must be taken concurrently. Mr. Howlett.

This course is designed to study primarily the physiological responses of horticultural plants that have been grown under varying environmental conditions. The emphasis will be placed upon the observation and examination of the plants themselves. Some of the subjects considered are: nitrogen deficiency, nitrate assimilation in horticultural plants, synthesis and reutilization of proteins, photoperiodism, carbohydrate deficiency, nitrogen-carbohydrate relationships, potassium, phosphorus, and calcium deficiency. In this connection the student will become acquainted with some current research methods in horticulture.

603. **Experimental Horticulture.** Three credit hours. Winter Quarter. Two lectures and one recitation each week. General prerequisites must include Botany 605. Mr. Gourley.

This course is designed to study methods of study and interpretation of results in the field of research and experimental horticulture. Particular attention is given to planning of experimental work, a review of outstanding contributions, a critical discussion of recent articles on horticultural investigations, a summary of the work in progress at various institutions, statistical methods, and preparation of subject matter for publication.

604. **Systematic Pomology.** Three credit hours. Autumn Quarter. Three two-hour conference periods each week. Given in alternate years. Mr. Gourley.

Nomenclature, classification, and identification of fruits; detailed descriptions, botanical relationships, adaptations, and commercial value of the commercial orchard fruits of the region.

† Not given during the academic year, 1936-1937.

605. The Literature of Horticulture. Three credit hours. Winter Quarter. Two recitations and one two-hour laboratory period each week. Given in alternate years. Mr. Paddock.

A study of the literature of horticulture.

622. Advanced Vegetable Gardening. Five credit hours. Spring Quarter. Four recitations and one two-hour laboratory period each week. Mr. Brown.

Devoted to the study of the history, anatomy, physiology, and culture of the principal vegetable crops including propagation, choice of varieties, soil adaptation, soil preparation, planting, fertilizing, cultivation, pest control, harvesting, storage methods, marketing and cost of production, and income.

Not open to students who have credit for Horticulture 422.

628. The Marketing of Fruits and Vegetables. Five credit hours. Spring Quarter. Five lecture periods each week. General prerequisites must include Rural Economics 613. Mr. Hauck.

The principles involved in marketing fruits and vegetables will be considered. Attention will be given to various phases of preparation for market, distribution, transportation, terminal facilities, auctions, inspection, market news, etc. Emphasis will be placed upon the market outlets and methods which are most suited to Ohio products. One or two inspection trips of two or three days each will be made.

Not open to students who have credit for Rural Economics 628.

649. Advanced Plant Propagation. Five credit hours. Winter Quarter. Four recitations and one three-hour laboratory period each week. Mr. Chadwick.

This course is devoted to an intensive and detailed physiological, anatomical, and practical study of the principles and practices of propagation.

Not open to students who have credit for Horticulture 449.

652. Structure of Vegetables and Ornamental Plants. Three credit hours. Autumn Quarter. One recitation and two two-hour laboratory periods each week. Time to be arranged. Mr. Gourley.

A study of the structure of vegetables and ornamental plants as they relate to the economic production of these crops. The course is designed for advanced students who desire to make a critical study of horticultural materials.

653. Structure of Economic Fruits. Three credit hours. Winter Quarter. One recitation and two two-hour laboratory periods each week. Time to be arranged. Mr. Gourley.

A study of the structure and vascular arrangement of horticultural fruits. The viewpoint and emphasis of this course are designed to familiarize students with the structures that play a part in the development of various types of fruits and the relation of these structures in cultural development, spraying, storage, and culinary use.

683. Arboriculture. Three credit hours. Autumn Quarter. Two recitations and one three-hour laboratory period each week. Mr. Laurie.

A study of the care of ornamental trees and shrubs. Fertilization, spraying, pruning, and tree surgery. A suitable course for those interested in city forestry, park maintenance, and cemetery development.

Not open to students who have credit for Horticulture 483.

701. Minor Investigations. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring. All instructors.

This course is for students who desire to work out special problems in the fields of pomology, vegetable gardening, floriculture or forestry. Students will elect work in their desired subjects after a conference with the instructor in charge.

704. Horticultural Seminary. One credit hour. Autumn, Winter, and Spring Quarters. Required of all graduate students majoring in horticulture. All instructors.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Horticulture and Forestry. Autumn, Winter, and Spring Quarters. Graduate students may do investigational work in some phase of the following subjects: pomology, vegetable gardening, plant breeding, floriculture, and forestry. Mr. Gourley, Mr. Brown, Mr. Laurie, Mr. Chadwick, Mr. Howlett, Mr. Wiesehuegel.

INDUSTRIAL ARTS EDUCATION

(See Education)

INDUSTRIAL ENGINEERING

Office, 125 Industrial Engineering Building

PROFESSORS YOUNGER AND KNIGHT (EMERITUS), ASSISTANT PROFESSORS RICKLY, MORRISON, LEHOCZKY, AND SCHNEIDER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Management of Men in Engineering Industries. Four credit hours. One Quarter. Autumn, Winter, Spring. Four recitations each week. General prerequisites must include an acceptable course in elementary machine work or practical experience. Mr. Younger.

The development of engineering organizations and a study of existing organizations. The management of men in engineering organizations.

602. The Laws of Engineering Management. Three credit hours. One Quarter. Autumn and Winter. Three recitations each week. General prerequisites must include an acceptable course in elementary machine work or practical experience. Mr. Lehoczky.

A consideration from an engineering standpoint of the fundamental laws of engineering management.

603. Time and Motion Study. Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. General prerequisites must include Industrial Engineering 623 or practical experience. Mr. Lehoczky.

Time and motion study. Development, aims and fundamentals of time study, job analysis and standardization, determination of allowed time formula construction and application.

623. Advanced Machine Work. Three credit hours. One Quarter. Autumn and Winter. One recitation and six laboratory hours each week. General prerequisites must include acceptable courses in elementary and advanced machine work. Mr. Morrison.

A course that gives practice corresponding to that of the tool and maintenance division of commercial shops. Tools, jigs, fixtures, development work, and repairs furnish the necessary exercises.

653. Time Study Laboratory. Three credit hours. Spring Quarter. One recitation and five laboratory hours each week. Concurrent, Industrial Engineering 603. Mr. Lehoczky.

Practice and application of time study methods to actual shop conditions. Determination from time study of piece work rates and of production costs. A term report is required of each student. This course to be taken concurrently with Industrial Engineering 603.

661. Production Control Charts. Three credit hours. One Quarter. Autumn, Winter, Spring. Two recitations and one two-hour laboratory period each week. Mr. Lehoczky.

The application of charts and graphs to production problems, organization, management, operation, labor and cost control. Laboratory exercises designed to supplement the theory.

701. Selection of Manufacturing Equipment. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include acceptable course in elementary machine work or practical experience. Mr. Younger.

The selection of manufacturing equipment. Specialized machines versus standard machines. The growing use of semi-automatic and full-automatic machine tools. Study of the product as regards machine tool to be used and the possibility of combining operations in one machine.

702. Work Routing. Four credit hours. Winter Quarter. Four recitations each week. General prerequisites must include Industrial Engineering 623 or practical experience. Mr. Younger.

The engineering problems involved in the proper sequence in manufacturing operations. Types of plants to secure the best arrangements of equipment and processing. Handling and supervising the product at and between machines.

706. Methods of Waste Elimination. Four credit hours. Spring Quarter. Four lectures and recitations each week. Mr. Younger.

A study of industrial standards, their control and application. Simplification, inspection, waste elimination, and allied subjects.

712. Management of Men in Engineering Industry. Three credit hours. One Quarter. Autumn, Winter, Spring. Three lectures each week. Mr. Younger.

The developing of engineering organizations. Jobbing and production shops. The coordination and organization of engineering functions. Work-analysis and routing. The handling of men in engineering organizations.

Not open to students who have credit for Industrial Engineering 601.

751. Tool Engineering. Three credit hours. Autumn Quarter. One recitation and six hours of drawing-room practice each week. General prerequisites must include Industrial Engineering 623 or practical experience. Mr. Rickly.

A course in the design of tools, jigs, and fixtures. Attention given to the forms, life and efficiencies of cutting tools. The simple elements of fixture design, such as different forms, locating points, clamping devices, and standardized parts, with drawing-room practice leading up to design of the more complicated fixtures.

752. Work-Routing Laboratory. Three credit hours. Winter Quarter. One recitation and two three-hour laboratory periods each week. Concurrent, Industrial Engineering 702. Mr. Lehoczky.

Practice in the work of placing machine tools and laying out departments in their proper sequence for manufacturing specific products to best economic advantage.

761. Elementary Production Control. Three credit hours. One Quarter. Autumn and Winter. Three lectures and recitations each week. General prerequisites must include Industrial Engineering 601. Mr. Lehoczky.

Quantitative analysis from the standpoint of cost control of machines, equipment, and labor.

762. Advanced Production Control. Three credit hours. One Quarter. Winter and Spring. Three lectures and recitations each week. General prerequisites must include Industrial Engineering 761. Mr. Lehoczky.

The application of quantitative methods of control in industry in the fields of inverse relationships, least cost combinations, purchasing quantities, seasonal production and related problems.

763. Production Control Research. Three credit hours. One Quarter. Autumn and Spring. Three meetings each week. General prerequisites must include Industrial Engineering 762. Mr. Lehoczky.

Advanced research work in special phases of the work given in Industrial Engineering 761 and 762. Each student is required to complete a project in his chosen field.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Industrial Engineering. Autumn, Winter, and Spring Quarters. Mr. Younger, Mr. Lehoczky.

Research work in the various phases of Industrial Engineering: production control, production economics, time and motion study, shop processes, etc.

ITALIAN

(See Romance Languages and Literature)

JOURNALISM

Office, Journalism Building

EMERITUS PROFESSORS MYERS AND HOOPER, ASSOCIATE PROFESSOR POLLARD, ASSISTANT PROFESSORS GETZLOE AND LUXON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

602. Feature Writing. Three credit hours. One Quarter. Autumn and Spring. Two recitations and one laboratory period each week on the Lantern. Open also to students in other colleges by special permission. Mr. Getzloe.

Instruction in and writing of special newspaper and magazine articles, together with investigation as to the market for such matter.

Not open to students who have credit for Journalism 502.

607. Special Newspaper Problems. One to three credit hours. One Quarter. Autumn and Winter. One recitation and one laboratory period each week on the Lantern. Mr. Luxon.

Consideration of the problems of newspaper work and direction, including advertising and circulation. Individual theses are required.

614. Newspaper Law. Three credit hours. One Quarter. Autumn and Winter. Three recitations each week. General prerequisites must include Journalism 401-402. Mr. Pollard.

Origin and development of the freedom of the press; history, principles, and provisions of the laws of libel and copyright and of other statutes affecting peculiarly newspapers and other publications.

Not open to students who have credit for Journalism 514.

621. Editorial and Critical Writing. Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. Mr. Getzloe.

Study of the purpose, form, style, and spirit of the editorial. Consideration of current events, practice in news interpretation and other editorial writing, and study of editorial pages. Study of the work of the newspaper dramatic, literary, music and art critic, with practice in the writing of reviews and criticisms.

622. The Press and Contemporary Affairs. Three credit hours. Winter Quarter. Three recitations each week. Mr. Getzloe.

The place of the newspaper in the social system. Study of its function and nature as an agency affecting public opinion. Discussion and interpretation of current events.

***625. Journalism Practice.** Two to five credit hours. One Quarter. A laboratory course in which work is done off the campus.

Credit in this course is given to students who complete, under the supervision of the School of Journalism, not less than six weeks as full-time staff members of a newspaper or newspapers approved by the School.

626. The Newspaper Business Office. Three credit hours. Winter Quarter. Three recitations each week. Mr. Pollard.

Consideration of the tasks and problems of the newspaper business manager, such as location, valuation, cost-finding, and advertising from the publisher's standpoint.

Not open to students who have credit for Journalism 526.

628. Newspaper Circulation and Promotion. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Pollard.

Factors affecting newspaper circulation. Types of newspaper circulation, and their evaluation. Circulation methods and policies in use on various types of newspapers, together with promotional, merchandising, and service functions of the newspaper.

* Not given in 1936-1937.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

802-803-804. The Newspaper as a Force in Human Progress. Two credit hours. Autumn, Winter, and Spring Quarters. All instructors.

Lectures, individual research, and group discussions participated in by those investigating related subjects. A study of the newspaper in its relation to democracy, and of the outstanding figures in journalism.

LATIN LANGUAGE AND LITERATURE

(See Classical Languages and Literature)

LAW

Office, 113 Page Hall

PROFESSORS ARANT, TUTTLE, LAYLIN, MATHEWS, HARRIS, VANNEMAN, HALLEN, AND LATTIN, ASSOCIATE PROFESSORS HUNTER, ROSE, AND MARTIN

Constitutional Law. Eight credit hours. Four hours, Autumn Quarter; four hours, Winter Quarter. Mr. Laylin.

(1) General principles of constitutional law, federal and state. Making and changing constitutions; function of judiciary in enforcing constitutions; separation and delegation of governmental powers; political and civil rights; interstate privileges and immunities of citizens; due process and equal protection of law; police power; taxation.

(2) The Federal Government. General scope of federal powers; foreign relations; territories, dependencies, and new states; federal taxation; regulation of commerce; inter-governmental relations.

Hall's Cases on Constitutional Law.

Contracts. Twelve credit hours. Five hours, Autumn Quarter; four hours, Winter Quarter; three hours, Spring Quarter. Mr. Arant.

Offer and acceptance; consideration; contracts under seal; conditions precedent and subsequent; discharge; third party beneficiaries; assignments; illegal contracts; the statute of frauds.

Corbin's Cases, 2nd Edition.

***International Law.** Three credit hours. Winter Quarter. Mr. Mathews.

A study of the principles of law governing intercourse between nations, chiefly as interpreted and applied by judicial and administrative bodies.

Hudson's Cases on International Law.

Legal Ethics. Two credit hours. Spring Quarter. Mr. Arant.

The nature of a profession; pecuniary limitations, advertising, solicitation, fees; lawyers' oath; ethical duties of lawyers to society, to courts, to clients, to litigants; ethics of employment.

Arant's Cases on Legal Ethics.

Legal Method. Three credit hours. Autumn Quarter. Mr. Rose.

A study of judicial reasoning based upon a survey of methodologies, past and present, including analysis of sources and growth of legal concepts and rules.

Selected material.

Legislation. Three credit hours. Spring Quarter. Mr. Mathews.

Legislation as a form of law; general legal aspects, methods, and limitations of effective control; policies and standards; phraseology and terms; technique of penal and of civil regulation. Discussion will be based upon the text, Legislative Regulation, by Ernst Freund, supplemented by special problems.

Mortgages. Three credit hours. Winter Quarter. Mr. Mathews.

Nature and elements of a mortgage, legal and equitable; incidents of the mortgage relation, right to possession and remedies of the mortgagee; discharge by payment, tender and merger; subrogation; assignments; redemption; foreclosure; extent of the lien, priorities between liens and competing claimants; and conveyance of the equity of redemption.

Casebook to be announced.

* Not given in 1936-1937.

Municipal Corporations. Three credit hours. Spring Quarter. Mr. Tuttle.
Character, origin and history; creation and control; corporate agencies; officers; legislation; powers; contracts; property; revenue; indebtedness; liability.
Casebook to be announced.

Negotiable Instruments. Four credit hours. Winter Quarter. Mr. Hunter.
Operative facts of negotiability; legal effect of negotiability-transfer, holders in due course, equities; the contractural element.
Britton's Cases on Bills and Notes, Second Edition.

Personal Property. Three credit hours. Autumn Quarter. Mr. Rose.
Possessory interests in chattels; acquisition of ownership; fixtures; emblements.
Bigelow's Cases on the Law of Personal Property, Second Edition.

Private Corporations. Six credit hours. Four hours, Winter Quarter; two hours, Spring Quarter. Mr. Lattin.
A consideration of the characteristics of private corporations, their formation, powers, liabilities, and dissolution; directors; stockholders, their rights and liabilities; rights of creditors against the corporation, its officers, stockholders, assignees, etc.
Casebook to be announced.

Public Utilities. Four credit hours. Autumn Quarter. Mr. Hunter.
The public utility concept as developed at common law and by statute; the obligations of the public utility status and their enforcement.
Welch's Cases on Public Utilities Regulation.

Real Property I. Six credit hours. Four hours, Winter Quarter; two hours, Spring Quarter. Mr. Martin.
Introduction to the law of real property; execution of deeds; description of property granted; estates created; covenants for title; estoppel by deed; priorities; adverse possession and prescription.
Fraser's Cases and Readings on Property. Aigler's Cases on Titles to Real Property.

Real Property II. Four credit hours. Spring Quarter. Mr. Martin.
Rights incident to the possession of land; profits, easements; licenses; covenants running with the land; rents; waste; public rights.
Bigelow's Cases on Rights in Land.

Sales. Four credit hours. Autumn Quarter. Mr. Lattin.
Transfer of title to personal property as a result of contract; rules for determining intent as to relative time of its transfer; different types of sales; documents of title; obligations of seller and buyer as to warranties; delivery and payment, inspection, acceptance; rights of unpaid seller; Statute of Frauds.
Williston and McCurdy's Cases on Sales.

MANUAL ARTS
(See Education)

MATHEMATICS
Office, 307 University Hall

PROFESSORS KUHN, RASOR, MORRIS, BLUMBERG, RADO, WEAVER, BAMFORTH, AND LA PAZ, ASSISTANT PROFESSOR BAREIS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.
These general prerequisites include an acceptable course in calculus.

601. Advanced Calculus. Five credit hours. Autumn Quarter. Mr. Rasor.
Selected topics from Advanced Calculus.

607. Introduction to the Theory of Functions of a Complex Variable. Five credit hours. Winter Quarter. General prerequisites must include Mathematics 601. Mr. Rasor.
The algebra of complex numbers with their corresponding geometric representation; conformal representation; theory of power series; definition and properties of analytic functions; introduction to the theory of functions as developed by Cauchy, Riemann, and Weierstrass with applications in physics and engineering.

611. Differential Equations. Five credit hours. Winter Quarter. Mr. Kuhn.

Linear equations with constant coefficients; equations of first, second, and higher orders: numerical approximations; solutions in series; existence theorems of Picard, Cauchy, and Frobenius; simple partial differential equations; applications.

***617. Introduction to Modern Mathematics.** Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include ten credit hours in mathematics beyond calculus, or permission of the instructor must be obtained. Mr. Blumberg.

The principal aim of this course is not the imparting of comprehensive information but the initiation of the student, by means of lectures, collateral reading and problems, into various mathematical domains. The content will be selected from the following fields: graphical and numerical methods, projective geometry, theory of numbers, the mathematical continuum, mathematical foundations, point sets, groups, probability, and relativity.

621. Advanced Euclidean Geometry. Five credit hours. Winter Quarter. Mr. Weaver.

Geometric constructions; points, lines and circles associated with a triangle; harmonic ranges and pencils; harmonic properties of the circle; radical axis; pole and polar with respect to a circle; inversion; symmedian points; Brocard points. This is chiefly a problem course in the field of plane geometry, and is of special value to teachers of this subject.

623. Projective Geometry. Five credit hours. Spring Quarter. Miss Bareis.

Plücker line coordinates, duality, infinite elements, projection, double ratio, projective coordinates in one and two dimensions, projective transformations, collineations and involutions in one direction, projective properties of conics.

†625. Solid Analytical Geometry. Five credit hours. Autumn Quarter. Given in alternate years. Miss Bareis.

Systems of co-ordinates; planes and lines; types of surface; quadric surfaces; duality.

641. Elementary Theory of Equations. Five credit hours. Autumn Quarter. Mr. Rasor.

Construction with ruler and compasses, numerical equations, determinants, symmetric functions. Text: Dickson's First Course in the Theory of Equations.

661. Vector Analysis. Five credit hours. Spring Quarter. General prerequisites must include Mathematics 601 and a course in physics. Mr. Weaver.

Vector and scalar algebra and geometry, differentiation and differential operators, applications to electrical theory and to mechanics, dynamics, and hydro-dynamics.

***671. Introduction to the Theory of Relativity.** Five credit hours. Autumn Quarter. General prerequisites must include Mathematics 661. Mr. Blumberg.

This course will be prefaced by a brief review of those parts of the classical theories of dynamics and physics which are necessary to an understanding of the special theory of relativity, its applications, and the elementary aspects of the general theory of relativity.

691. Probability. Five credit hours. Autumn Quarter. Given in alternate years. General prerequisites must include a course in calculus. Mr. Morris.

The first half of the course will be devoted to the development of the theory of probability from the standpoint of permutations, combination, choice and chance; the second half to a formal development of the subject as given by Coolidge in "Introduction to Probability."

692. Finite Differences. Five credit hours. Winter Quarter. Given in alternate years. General prerequisites must include Mathematics 691. Mr. Morris.

An introduction to finite differences; development of the more important methods of interpolation and summation.

696. Statistics. Five credit hours. Spring Quarter. Given in alternate years. General prerequisites must include Mathematics 691. Mr. Morris.

Derivation of statistical formulas by use of the theory of probability; least squares and their application to curve fitting; frequency distribution curves.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

700. Minor Problems. Three to five credit hours. Autumn, Winter, and Spring Quarters.

This course consists of conferences, assigned readings, and reports for minor investigations.

701. Introduction to Analysis I. Five credit hours. Autumn Quarter. In addition to the general prerequisites, permission of instructor must be obtained. Mr. Radó.

The principal aim will be not to equip the student with comprehensive knowledge, but to train him in handling with some facility various fundamental notions and methods in analysis. The subject matter will be selected from the following topics: the real continuum; introduction to the Theory of Point Sets; basal notions in the field of real functions; measure; Riemann, Lebesgue, and other integrals; multiple integrals; Green's and related theorems; implicit functions; series, and in particular, introduction to Fourier series.

702. Introduction to Analysis II. Five credit hours. Winter Quarter. In addition to the general prerequisites, permission of instructor must be obtained. Mr. Radó.

A continuation of Mathematics 701.

703. Introduction to Analysis III. Five credit hours. Spring Quarter. In addition to the general prerequisites, permission of instructor must be obtained. Mr. Radó.

A continuation of Mathematics 702.

741-742-743. Introduction to Higher Geometry. Five credit hours. Autumn, Winter, and Spring Quarters. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. Radó.

Metric, affine, and projective properties of conic sections and of quadric surfaces. Fundamental notions of differential geometry. Geometry on a surface. Non-Euclidean geometries. Groups of transformations.

***761-*762-*763. Introduction to Higher Algebra.** Five credit hours. Autumn, Winter, and Spring Quarters. In addition to the general prerequisites, permission of the instructor must be obtained.

Elementary theory of number; congruences; binary forms; continued fractions; groups; fields; matrices; invariants; elementary divisors; Galois fields; algebraic fields; ideals.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 687.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Students intending to specialize in mathematics should acquire as soon as possible a reading knowledge of French, German, and Italian.

NOTE: Students should consult with instructors before registering for courses open only to graduates.

GRADUATE MATHEMATICS CLUB

The Graduate Mathematics Club fosters interest in the latest advances in Mathematics, its application and its pedagogy. The meetings, which are held fortnightly consist of reports by members of the staff and by graduate students on their own investigations or on recent books or journal articles, and of addresses intended to orient the members of the Club in reference to various mathematical branches of wide scope. As far as possible, the presentation of the papers demands a minimum of technical equipment on the part of the hearers and is on the whole intended to be intelligible to students beginning their graduate work. Since it is the Graduate Mathematics Club which brings into special focus the living, growing character of mathematical science, it is expected that all graduate students of mathematics will cooperate in the work of the Club and attend the meetings regularly.

***801-*802-*803. Theory of Functions of a Complex Variable.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 703 or permission of the instructor must be obtained. Mr. Radó.

Fundamentals. Application to Conformal Mapping.

* Not given in 1936-1937.

804-805-806. Point Sets and Real Functions. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 703 or permission of the instructor must be obtained. Mr. Blumberg.

A development of the ideas from the simplest to those contained in current literature. The principal aim is the comprehension of the principles for asking and answering questions in this field.

***807-*808-*809. Ordinary and Partial Differential Equations.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 703 or permission of the instructor must be obtained. Mr. Bamforth.

Existence theorems; properties of solutions depending upon initial conditions and parameters; geometrical properties of solutions; dynamical systems; stability of solutions; linear differential equations. Applications to problems in engineering, physics, chemistry.

810-811-812. Calculus of Variations. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 703 or permission of the instructor must be obtained. Mr. LaPaz.

Formulation of typical problems; classical necessary conditions; the Jacobi condition and the criteria for conjugate points due to Bliss; imbedding theorems and the Weierstrass sufficiency proof; the Hamilton-Jacobi theory; double integral problems; inverse problems and direct methods in the calculus of variations; applications in engineering, physics, and Riemannian geometry.

813-814. Mathematical Methods in Theoretical Physics. Three credit hours. Autumn and Winter Quarters. General prerequisites must include Mathematics 601 or permission of the instructor must be obtained. Mathematics 813 and 814 are prerequisite for Physics 860 and 861. Mr. Bamforth.

This course aims to discuss from a mathematical point of view topics which are fundamental in the study of modern theoretical physics, such as series development of arbitrary functions, integral equations, calculus of variations, boundary value problems, and potential theory.

816. Fourier's Series and Spherical Harmonics. Three credit hours. Spring Quarter. General prerequisites must include Mathematics 701, 702, or permission of the instructor must be obtained. Mr. Bamforth.

Convergence, summability, integration and differentiation of Fourier's Series, expansions of functions in terms of Legendre's Polynomials, and surface spherical harmonics; applications to physics.

***818. Infinite Series and Products.** Three credit hours. Autumn Quarter. General prerequisites must include ten Quarter-hours of mathematics beyond calculus. Mr. Blumberg.

This course includes selections from the following topics: theories of irrationals; series of positive terms; convergence tests; general series; double series; transformation of series; infinite products; Fourier, Dirichlet and power series; special series; divergent series.

***820. Integral Equations.** Three credit hours. Spring Quarter.

†823. Tensor Analysis. Three credit hours. Spring Quarter. In addition to the general prerequisites, permission of the instructor must be obtained Mr. MacDuffee.

Foundations and algorithms of the metric tensor calculus; applications in the theory of relativity; the geometry of paths; tensors of the calculus of variations.

***825. Partial Differential Equations.** Three credit hours. In addition to the general prerequisites, permission of the instructor must be obtained.

A study of partial differential equations of the first and second order, with special attention to the various applications to geometry and physics.

***841-*842-*843. Differential Geometry.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 743 or permission of the instructor must be obtained. Mr. Radó.

Review of fundamental notions. Applications of the general theory to special problems, in particular to problems in the large and to variation problems arising in connection with length, area, volume, curvature.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

†861. **Theory of Fields.** Three credit hours. Autumn Quarter. General prerequisites must include Mathematics 763.

Steinitz's theory of fields.

*862. **Theory of Matrices.** Three credit hours. Winter Quarter. General prerequisites must include Mathematics 861.

Advanced topics in the theory of matrices with particular attention to matrices with integral elements.

*867. **Linear Algebras.** Three credit hours. Winter Quarter. General prerequisites must include Mathematics 862.

A study of linear algebras and their arithmetics, with particular attention to Dickson's theory of hypercomplex integers.

*868. **Theory of Ideals.** Three credit hours.

Ideal theory of commutative and non-commutative rings.

*871-*872. **Finite Groups.** Three credit hours. Winter and Spring Quarters. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. Kuhn.

Fundamentals of the theory of finite groups; the abstract, permutation, and linear groups; the Galois theory of equations.

*874. **Continuous Groups.** Three credit hours. In addition to the general prerequisites, permission of the instructor must be obtained.

A study of Lie's theory of r-parameter continuous groups with an introduction to some of the recent investigations of Cartan and Weyl.

*891. **Advanced Statistics.** Three credit hours. Spring Quarter. General prerequisites must include Mathematics 696. Mr. Morris.

Small sample theory and its applications to statistical problems.

950. **Research in Mathematics.** Autumn, Winter, and Spring Quarters. Library work and conferences. In addition to the general prerequisites, the permission of the department must be obtained.

MECHANICAL ENGINEERING

Office, 247 Robinson Laboratory

PROFESSORS MARQUIS, NORMAN, JUDD, BROWN, BUCHER, AND STINSON, ASSISTANT PROFESSORS MOFFAT, BEITLER, AND ROBERTS, MR. MARCO

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These general prerequisites include fundamental courses in mathematics, physics, and mechanics.

605. **Heating and Ventilating.** Four credit hours. Spring Quarter. Four recitations each week. General prerequisites must include Mechanical Engineering 608. Mr. Brown.

A descriptive and analytical study of the apparatus and machinery and of the layouts used in the heating and ventilating of buildings.

Not open to students who have credit for Mechanical Engineering 551 and 572.

607. **Heat-Power Engineering.** Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include a course in engineering drawing and a year of elementary chemistry. Mr. Marquis, Mr. Bucher.

The beginning of a study of thermodynamics, and of an analytical and descriptive study of steam-generating and steam-using machinery, and of air compression and refrigeration.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

608. Heat-Power Engineering. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include Mechanical Engineering 607. Mr. Marquis, Mr. Bucher.

The continuation of Mechanical Engineering 607.

609. Heat-Power Engineering. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 608. Mr. Marquis.

The continuation of Mechanical Engineering 608.

615. Mechanism. Five credit hours. One Quarter. Autumn and Winter. Three recitations and two three-hour laboratory periods each week. General prerequisites must include a course in engineering drawing. Mr. Stinson.

A classroom and drawing-board study of mechanisms and kinematics of machines.

Not open to students who have credit for Mechanical Engineering 614 and 616.

617. Mechanical Engineering Laboratory. Four credit hours. Autumn Quarter. Two recitations and one four-hour laboratory period each week. General prerequisites must include Mechanics 607 and 610, Metallurgy 651, and two Quarters of college physics. Mr. Beitler, Mr. Marco.

Lecture and recitations on pressure and temperature measurements, on steam engines and turbines, and on boilers and combustion. Laboratory work in the calibration of pressure gauges and indicator springs; testing of steam engines, pumps and boilers.

625. Internal Combustion Engines. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 608 and 615, or 507, or 509. Mr. Stinson, Mr. Roberts.

A study of internal combustion engines and their auxiliaries.

627. Materials of Engineering. Five credit hours. One Quarter. Autumn and Winter. Five recitations each week. Mr. Moffat.

A study of the production and properties of the materials used in engineering structures and machinery.

Not open to students who have credit for Mechanical Engineering 427.

664. Mechanical Engineering Laboratory. Three credit hours. Winter Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 607 and Mechanics 610; Mechanics 602 and Mechanical Engineering 608 must be taken previously or concurrently. Mr. Bucher, Mr. Brown, Mr. Roberts, Mr. Marco.

The calibration of thermometers, pressure gauges, and other instruments; indicator practice; operation of steam engines; tests of oils, lubricants, the materials of construction, and of steam engines.

665. Mechanical Engineering Laboratory. Three credit hours. Spring Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 608 and 664. Mechanical Engineering 609 and Mechanics 607 must be taken previously or concurrently. Mr. Bucher, Mr. Brown, Mr. Roberts, Mr. Marco.

Valve setting, moisture determination in steam, gas calorimetry, measurements of the flow of water by means of orifices, nozzles, weirs, and venturimeters, and tests of steam engines.

703. Aeronautical and Automotive Engines. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include Mechanics 602 and 607 and Mechanical Engineering 625. Mr. Stinson.

A descriptive and analytical study of automotive and aeronautical engines and their auxiliaries.

Not open to students who have credit for Mechanical Engineering 756.

704-705. Automotive Engineering. Three credit hours. Winter and Spring Quarters. Three recitations each week. General prerequisites must include Mechanical Engineering 625 or 703. Mr. Stinson.

An advanced study of automotive engines, chassis and auxiliaries.

725. Diesel Engines. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 625 or 704. Mr. Stinson.

An advanced study of Diesel-engine design, operation and economics.

727. Machine Design. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include Mechanics 602, Mechanical Engineering 609 and 615 or a course in engineering drawing. Mr. Norman.

A detailed course of study based upon mechanics and the materials of construction applied to the design and construction of machinery.

728. Machine Design. Five credit hours. Winter Quarter. Three recitations and two three-hour laboratory periods each week. General prerequisites must include Mechanical Engineering 727. Mr. Norman.

The continuation of Mechanical Engineering 727.

742. Hydraulic Machinery. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include Mechanics 607 and 610 and Mechanical Engineering 609. Mr. Judd, Mr. Beitler.

The application of hydraulic principles to hydraulic machinery.

743. Machine Design. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 728. Mr. Norman.

The continuation of Mechanical Engineering 728.

744. Machine Design. Five credit hours. Spring Quarter. Three recitations and two three-hour laboratory periods each week. General prerequisites must include Mechanical Engineering 728. Mr. Norman.

The continuation of Mechanical Engineering 728.

757. Aeronautical Engineering. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Mechanics 602, 607, and 610. Mr. Stinson.

A descriptive and analytical study of the various forms of aircraft and the elementary principles of aerodynamics.

779. Mechanical Engineering Laboratory. Three credit hours. Autumn Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 609, 625, and 665. Mr. Brown, Mr. Bucher, Mr. Marco.

Tests of steam engines; steam boilers; gas, oil and automotive engines; air compressors; centrifugal, rotary and power pumps; impulse and turbine water wheels; fans and blowers; steam turbines.

780. Mechanical Engineering Laboratory. Three credit hours. Winter Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 779. Mr. Bucher, Mr. Stinson, Mr. Roberts.

The work undertaken will be elected from the following:

(a) General Mechanical Engineering Laboratory. Tests of mechanical equipment such as air compressors, steam turbines, fans, oil, gas, and automotive engines, pumps, and hydraulic turbines, so selected as to be fundamental to all branches of mechanical engineering.

(b) Automotive Engineering Laboratory. Tests of apparatus of special interest in automotive engineering such as internal combustion engines, and complete vehicles, in the laboratory and on the road. To be taken only by students who elect Mechanical Engineering 704.

781. Mechanical Engineering Laboratory. Three credit hours. Spring Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 780. Mr. Bucher, Mr. Stinson, Mr. Roberts.

The work undertaken will be elected from the following:

(a) General Mechanical Engineering Laboratory. A continuation of Mechanical Engineering 780-a.

(b) Automotive Engineering Laboratory. A continuation of Mechanical Engineering 780-b. To be taken only by students who elect Mechanical Engineering 705.

(c) Hydraulic Power Laboratory. A laboratory study of the dynamics of jets, the flow and measurement of water and the testing of impulse and reaction turbines. To be taken only by students who have credit for Mechanical Engineering 742.

799. Special Problems in Advanced Mechanical Engineering. Two to ten credit hours. Autumn, Winter, and Spring Quarters. All instructors.

This course is intended to give the advanced student opportunity to pursue special studies not offered in the fixed curriculum. Work undertaken will be elected from aeronautical engineering, heating, ventilating and air conditioning, hydraulic power, air compression, refrigeration, steam turbines, internal combustion engines, and other special problems in Advanced Mechanical Engineering. A student may repeat this course until he has obtained a maximum of 24 credit hours. He may accumulate not more than ten credit hours in any one of the above subdivisions.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 86.

These prerequisites include a collegiate course in mechanics, strength of materials, machine design, steam or gas engines and knowledge of the fundamentals of hydraulics. For major work a student must hold a baccalaureate degree in mechanical engineering or the equivalent.

The following courses are offered in one or more Quarters (Autumn, Winter and Spring). The work may include lectures, conferences, library, drawing board and laboratory work. Credit hours (unless definitely stated) to be arranged.

804. Advanced Mechanical Engineering. Two to eight credit hours. The following course is offered in one or more Quarters. Autumn, Winter, Spring. The work includes conferences, library, drawing board, and laboratory work.

(a) Internal Combustion Engines. Mr. Stinson, Mr. Roberts.
(b) Steam Power Plants. Mr. Marquis, Mr. Bucher.
(c) Machine Design. Mr. Norman.
(d) Heating and Ventilating. Mr. Brown.
(e) Hydraulics. Mr. Judd.

950. Research in Mechanical Engineering. Research work in any of the following fields, under the supervision of the following instructors: automotive engineering and internal combustion engines, Mr. Stinson, Mr. Roberts; heating, ventilating, air conditioning, and refrigerating, Mr. Brown; applied hydraulics, Mr. Judd, Mr. Beitler; machine design and mechanical vibration, Mr. Norman; materials of engineering, Mr. Moffat; steam engineering and fuel testing, Mr. Marquis, Mr. Bucher.

MECHANICS

Office, 225 Industrial Engineering Building

PROFESSORS BOYD AND OTT, ASSOCIATE PROFESSORS FOLK AND POWELL, ASSISTANT PROFESSORS CLARK AND TUCKER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 86.

These prerequisites include acceptable courses in differential and integral calculus and physics.

601. Statics. Five credit hours. One Quarter. Autumn and Winter. Five recitations each week. Mr. Ott, Mr. Boyd, Mr. Folk, Mr. Powell, Mr. Clark, Mr. Tucker.

602. Strength of Materials. Five credit hours. One Quarter. Autumn, Winter, Spring. Four recitations and one two-hour laboratory period each week. General prerequisites must include a course in statics. Mr. Ott, Mr. Boyd, Mr. Folk, Mr. Powell, Mr. Clark, Mr. Tucker.

Stresses and deformations: torsion; riveted and welded joints; deflection of beams and columns by double integration; horizontal shear; tapered beams.

605. Strength of Materials. Two credit hours. One Quarter. Autumn, Winter, Spring. Two recitations each week. General prerequisites must include Mechanics 602. Mr. Ott, Mr. Boyd, Mr. Folk, Mr. Clark, Mr. Powell.

Combined stress; resilience in bending and torsion; inclined beams; deflection by area moments; statically indeterminate beams.

607. Dynamics. Three credit hours. One Quarter. Autumn, Winter, Spring. Three recitations each week. General prerequisites must include a course in statics. Mr. Boyd, Mr. Folk, Mr. Ott, Mr. Powell, Mr. Tucker, Mr. Clark.

Dynamics of linear and angular motion from constant forces and forces proportional to displacement; connected bodies; impulse and momentum; combined rotation and translation; work, energy, and power.

610. Mechanics of Fluids. Three credit hours. One Quarter. Winter and Spring. Three recitations and six hours of preparation each week. General prerequisites must include a course in statics. Mr. Boyd, Mr. Folk, Mr. Ott, Mr. Powell.

Fluid pressure; stability of simple gravity dams; orifices, weirs, and pipes; fluid friction; steady-state flow in pipes and open channels; Venturi tubes; pressure of deviated flow.

702. Advanced Strength of Materials. Three credit hours. Autumn Quarter. Three lectures or recitations each week. General prerequisites must include Mechanics 602. Mr. Folk.

Compound stresses; theories of failure of elastic action; design of thick-walled cylinders; stresses in flat plates by approximate methods and by Grashof's formula; curved beams and hooks; torsion in non-circular sections; unsymmetrical sections; indeterminate beams by area moments and slope deflection.

707. Advanced Dynamics. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Mechanics 607. Mr. Ott.

Acceleration, velocity and displacement from variable forces. Vibration, free and forced. Percussion and impact. Dynamic balance. Vibration and whipping of shafts. Gyroscopic motion.

710. Advanced Mechanics of Fluids. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanics 610. Mr. Powell.

A continuation of hydraulics given in Mechanics 610, including additional work on the flow through orifices, over various weirs, and through other measuring devices; the flow of fluids through pipes; uniform and non-uniform flow in open channels; the various critical velocities; and the elements of dimensional analysis and dynamic similarity as applied to model testing.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

801-802-803. Advanced Theoretical Mechanics. Three credit hours. Autumn, Winter, and Spring Quarters. Three recitations each week. Mr. Boyd.

MEDICAL AND SURGICAL RESEARCH

Office, 202 Kinsman Hall

PROFESSORS DOAN AND CURTIS, ASSOCIATE PROFESSOR WISEMAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Medical and Surgical Research. Autumn, Winter, Spring, and Summer Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the basic pre-clinical sciences, Medical and Surgical Research 600 or 601, and proof of an interest in and the ability to undertake the selected project. The student may spend a part of all of his time in research work. Research work primarily in the medical field is conducted under the supervision of Dr. Doan and Dr. Wiseman; in the surgical field under Dr. Curtis; though an intimate intercorrelation is maintained at all times among the entire staff in every problem under study in the department.

MEDICINE
Office, Hamilton Hall

ASSISTANT PROFESSOR VAN BUSKIRK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

635. Hygiene and Sanitation. Three credit hours. Autumn Quarter. Three lectures or quiz hours each week. General prerequisites must include the first three years in the curriculum of Medicine. Mr. Van Buskirk.

This course includes the hygiene and sanitation of the communicable diseases, the deficiency and occupational diseases as applied to preventive medicine. Immunity, heredity, and eugenics. The diseases arising from the puerperal state and the diseases of infancy and childhood with reference to their prevention. The protection and function of food; water supply, sewage, and refuse disposal; ventilation, heating and certain aspects of personal hygiene. Public Health administration, disinfection and demography.

In addition to the theory of the subject, the student is assigned practical problems in Hygiene and Sanitation.

Not open to students who have credit for Public Health and Hygiene 604.

METALLURGY
Office, 100 Lord Hall

PROFESSORS DEMOREST AND MUELLER, ASSOCIATE PROFESSOR LORD

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These general prerequisites include fundamental courses in physics and metallurgy.

605. Iron and Steel Metallurgy. Three credit hours. Autumn Quarter. Three lectures or recitations each week. General prerequisites must include Metallurgy 651. Mr. Demorest, Mr. Lord.

Lectures and problem work on the production of iron and steel and the manufacture of iron and steel shapes. Special emphasis is given to the application of thermodynamics to the equilibria approached in metallurgical operations.

606. Principles of Metallography. Three credit hours. One Quarter. Autumn and Spring. Two lectures and three hours of laboratory each week. General prerequisites must include one year of college physics and two Quarters of college chemistry. Mr. Lord.

Lectures and laboratory work on the structures and the properties of metals and alloys. Metal structures and equilibrium relationships studied with the aid of the microscope.

610. Non-Ferrous Metallurgy. Five credit hours. Spring Quarter. Five recitations each week. General prerequisites must include one year each of college physics and college chemistry. Mr. Mueller.

Lectures, recitations, and problem work on the metallurgy and properties of non-ferrous metals, with special attention to the principles of igneous concentration of the precious metals and study of hydro-metallurgical and electro-metallurgical processes of the present day.

620. Principles of Ore Dressing. Five credit hours. Autumn Quarter. Three lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include a course in descriptive mineralogy and one year of college physics. Mr. Mueller.

Lectures, recitations, and laboratory work on the principles of ore dressing, reclamation of minerals and metals, and coal washing.

650. Pyrometry. Two credit hours. One Quarter. Autumn and Winter. One lecture or recitation and one three-hour laboratory period each week. Mr. Demorest, Mr. Lord.

Lectures, laboratory, and problem work on the calibration and use of resistance thermo-electric, optical, and total radiation pyrometers.

651. Fuels. Three credit hours. One Quarter. Autumn and Winter. Three lectures or recitations each week. Mr. Demorest, Mr. Mueller, Mr. Lord.

Lectures, recitations, and problem work on solid, liquid, and gaseous fuels, their use, preparation and efficiencies, the thermo-chemistry of combustion and gas equilibria.

665. General Metallurgy. Five credit hours. Spring Quarter. Five lectures or recitations each week. General prerequisites must include two Quarters of college chemistry. Mr. Mueller.

Lectures, recitations, and problem work on the metallurgy of iron, steel, copper, lead, zinc, gold, silver, etc., including the principles of igneous, hydro-metallurgical and electro-metallurgical processes for recovery and refining of the common metals.

701. Advanced Metallography. Four credit hours. Winter Quarter. Two lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include Metallurgy 606. Mr. Lord.

An extended study of the structures and properties of the various forms of carbon steel and cast iron with special emphasis on the theory of heat treatment.

Laboratory work in the microscopic study of ferrous alloy structures and the taking of photomicrographs.

705. Metallurgical Construction. Four credit hours. Winter Quarter. Two lectures or recitations and three two-hour laboratory periods each week. General prerequisites must include Metallurgy 651, 605, 720, 610, or 655. Mr. Mueller.

Lectures, recitations, and drawing-room practice on the principles, practice, and design of concentrators and coal-washing plants.

706. Metallurgical Construction. Four credit hours. Spring Quarter. Two lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include Metallurgy 705. Mr. Demorest, Mr. Lord, Mr. Mueller.

Option: continuation of Metallurgy 705 with special reference to operation, control, costs, and handling of materials; or lectures, recitations, and drawing-room practice on the principles, practice, and design of metallurgical furnaces and plants with special reference to refractories and heat transfer and to operation, control, costs, and handling of materials.

709. Advanced Fuel Testing and Problems. Four credit hours. Autumn Quarter. Two lectures and two three-hour laboratory periods each week. General prerequisites must include Metallurgy 651. Mr. Demorest, Mr. Mueller.

Lectures, problems, and laboratory work on the technology and thermodynamics of combustion and fuel production and utilization.

720. Ore Dressing. Three credit hours. Winter Quarter. One lecture and two three-hour laboratory periods each week. General prerequisites must include Metallurgy 620. Mr. Mueller.

Lectures and laboratory work in the design of flow sheets and concentration practice for ores, and leaching processes.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Metallurgy. Autumn, Winter, and Spring Quarters. Mr. Demorest, Mr. Mueller, Mr. Lord.

MINE ENGINEERING
Office, 219 Lord Hall

PROFESSORS NOLD AND F. A. RAY (EMERITUS), ASSOCIATE PROFESSOR O'ROURKE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Prospecting and Preliminary Operations. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include a course in geology. Mr. O'Rourke.

Prospecting and boring, their geologic and economic interpretation. Supporting excavations and the materials used.

602. Explosives and Rock Work. Three credit hours. Winter Quarter. Three recitations each week. Elective for students whose major work is not in mine engineering. General prerequisites must include a course in chemistry and general geology.

Explosives, quarrying, tunnelling, shaft sinking, dredging and excavating machinery.

Not open to students who have credit for Mine Engineering 761.

701. Development and Methods of Mining. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mine Engineering 602. Mr. Nold.

Development, location of openings, methods of mining, etc.

702. Mine Operations. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include Mine Engineering 701, Electrical Engineering 642 and 643. Mr. Nold.

Drainage, haulage, hoisting, ventilation, illumination, mine gases, and explosions.

703. Mine Examinations and Reports. Five credit hours. Winter Quarter. Five lectures each week. General prerequisites must include Mine Engineering 702 or 721. Mr. Nold, Mr. O'Rourke.

Mine examinations, estimation of ore reserves, valuation, reports, organization, administration and determination of costs.

721. Petroleum Engineering. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include a course in geology and a course in physics. Mr. O'Rourke.

Prospecting, drilling, and development of oil and gas fields, oil recovery methods.

722. Petroleum Engineering. Three credit hours. Winter Quarter. Two recitations and one two-hour laboratory period each week. General prerequisites must include Mine Engineering 721. Mr. O'Rourke.

Power gathering systems, preparation of crude petroleum for market, storage, transportation. Laboratory work in examining and testing crude petroleum and petroleum bearing rocks.

750. Mine Investigations. Three to ten credit hours. Autumn, Winter, and Spring Quarters. Conference, library, and laboratory work. In addition to the general prerequisites, the consent of the instructor must be obtained. This course may be repeated until the student has accumulated not to exceed twenty-four credit hours. Mr. Nold, Mr. O'Rourke.

(a) Study and Investigation of Some Phases of Mine Development and Operation.
(b) Study of Mine Ventilation and Laboratory Work with Ventilating Equipment.
(c) Study of the Engineering Problems of Petroleum and Natural Gas Exploration, Production, and Transportation.
(d) Design of mines, mining plants, or planning of petroleum and natural gas field development.

760. Principles of Mining. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include a course in geology. Mr. Nold.

Recitations and lectures on the principles of prospecting and mining.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Mine Engineering. Autumn, Winter, and Spring Quarters. Mr. Nold, Mr. O'Rourke.

Library, conference, laboratory, and field work on some phase of mining or mine operations.

MINERALOGY

Office, 115 Lord Hall

PROFESSOR McCAUGHEY, ASSOCIATE PROFESSOR BRANT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include fundamental courses in crystallography and mineralogy.

601. Advanced Crystallography. Five credit hours. Spring Quarter. Mr. McCaughey.

Study of the thirty-two crystal groups and their representative crystals. Structure of crystals as determined by X-ray analysis. Laboratory practice with the two circle gomometer in the measurement of crystals and in the drawing and projection of crystals.

605. Thermochemical Mineralogy. Three credit hours, Autumn Quarter. Four credit hours, Spring Quarter. Three or four lectures each week. General prerequisites must include an acceptable course in physical chemistry. Mr. McCaughey.

Thermal properties of minerals, their formation and transformation in silicate mixtures.

606. Advanced Thermochemical Mineralogy. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include Mineralogy 605. Mr. McCaughey.

Continuation of Mineralogy 605. Formation and solid solution of silicate minerals in multiple component systems.

611. Elementary Microscopic Petrography. Four credit hours. Winter Quarter. Two lectures and two two-hour laboratory periods each week. General prerequisites must include a course in descriptive mineralogy and Geology 609, or a college course in physics, including light. Mr. McCaughey, Mr. Brant.

Instruction and practice in the use of the petrographic microscope in the identification and study of minerals and rocks in thin section.

621. Microscopic Mineralogy. Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. General prerequisites must include a course in descriptive mineralogy and a college course in physics, covering light. Mr. McCaughey, Mr. Brant.

The use of a polarizing microscope in the identification of minerals in fine powder and thin section. Determination of the optical constants of minerals and crystallized substances with the polarizing microscope.

631. Mineralogical Investigations. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Library, conference, and advanced laboratory work. General prerequisites must include a course in descriptive mineralogy and Mineralogy 621 or 611. Mr. McCaughey.

(a) Microscopic Petrography. Study and investigation of igneous, metamorphic, and sedimentary rocks in thin section.

(b) Soil Mineralogy. Mineralogical investigation of loose rock, such as soils, sand, and clays.

(c) Applied Microscopic Mineralogy. Application of the principles of microscopic mineralogy to the determination of melting and transformation temperature of minerals; microscopic study of refractories, ceramic products and glasses.

(d) X-ray Crystal Analysis. Practice in the application of X-rays to the study of minerals and crystallized materials. Calculation for and determination of the fine structure of crystals.

*654. X-rays and Crystal Structure. Three credit hours. Winter Quarter. Three lectures and recitations each week. Given in alternate years. Mr. Blake, Mr. McCaughey, Mr. Harris.

This course is designed for those students in physics, chemistry, and mineralogy who intend to do research work in crystal structures and X-ray analysis.

This course is the same as Chemistry 654 and Physics 654.

Not open to students who have credit for Physics 814.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION." page 36.

950. Research in Mineralogy and Petrography. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory. Mr. McCaughey, Mr. Brant.

MUSIC

Offices, 1, 2, 3, 4 Page Hall

PROFESSORS HUGHES, WEIGEL, LEEDER, DIERCKS, AND WILSON, ASSISTANT PROFESSORS JONES, THOMAS, SLAWSON, DIERKER, HARDY, AND GILLILAND

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Detailed information concerning these prerequisites follows:

Requirements for Admission to Graduate Work in Music

1. One hundred hours of acceptable academic work, including English, Science, History, Psychology, etc.
   (a) Students majoring in Music Education should also have courses in the theory of education and adequate preparation in the field of Music Education.
   (b) Students majoring in the History of Music should also have a reading knowledge of either French or German sufficient for purposes of research.
2. Seventy hours of the theory of music, including a satisfactory amount of sight-singing and ear-training, harmony, analysis and form, history of music, conducting and instrumentation.
3. Twenty hours of applied music, including
   (a) for majors in Music Education, courses in strings, wood-wind and brass, and a degree of advancement in piano and voice satisfactory to the department;
   (b) for majors in the History of Music, an acquaintance with instrumental literature and performance ability on some instrument (preferably piano) satisfactory to the department.
4. A period of at least one year between the awarding of the bachelor's degree and completion of the requirements for the master's degree, preferably before the beginning of graduate study; this period should be spent in music teaching, and, in the case of majors in music education, must be so spent.

Requirements for the Master of Arts Degree

1. Music Education
   (a) Music—15 hours from the following group, recommended according to the interest and preparation of the student.
   Supervision (612)—3 hours; (613)—3 hours
   Conducting (642)—3 hours; (643)—3 hours
   History and Appreciation (602) 3 hours; (605)—3 hours; (606)—3 hours; (607)—3 hours
   Other courses chosen in consultation with the department.
   (b) Music—Minor Problems (650)—15 hours.
   (c) Electives in other fields—15 hours
   Under certain circumstances, a part of this requirement may be taken in music.
2. In History of Music
   (a) Music
   History of Music (602)—3 hours; (605)—3 hours; (606)—3 hours; (607)—3 hours
   Music electives, as advised—9 hours
   (b) Music—Minor Problems (650)—15 hours
   (c) Electives in other fields—15 hours.

* Not given in 1936-1937.

601. The Romanticists. Four credit hours. Autumn Quarter. Four lectures each week. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. Hughes, Mrs. Mooney.

The music of the romantic period in Germany and France.

***602. Wagner and the Music Drama.** Three credit hours. Autumn Quarter. Three lectures each week. Given in alternate years. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. Hughes, Mrs. Mooney.

Study of the works of Wagner and his contribution to the opera.

603. Modern Music. Four credit hours. Spring Quarter. Four lectures each week. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. Hughes, Mrs. Mooney.

A brief survey of modern developments with special reference to the composers of France and Russia.

***605. History of Choral Music.** Three credit hours. Winter Quarter. Three lectures each week. Given in alternate years. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. Hughes, Mrs. Mooney.

Choral composers and literature with special consideration of the sixteenth and seventeenth centuries.

Not open to students who have credit for Music 305 and 306.

606. Chamber Music—Haydn to Brahms. Three credit hours. Autumn Quarter. Three lectures each week. Given in alternate years. General prerequisites must include Music 601 and a course in history and appreciation of music, or permission of the instructor. Mr. Hughes, Mrs. Mooney.

A survey of the chamber music of the classical and romantic periods with performance, analysis, and discussion.

607. Instrumental Music Before Bach. Three credit hours. Winter Quarter. Three lectures each week. Given in alternate years. General prerequisites must include courses in history and appreciation of music, or permission of the instructor. Mr. Hughes, Mrs. Mooney.

A study of organ and other keyboard compositions and of chamber music and early orchestra writing in Germany, Italy, France, and England in the period 1650 to 1725.

609. Music Literature for the Elementary School. Four credit hours. Winter Quarter. Four recitations each week. General prerequisites must include a course in music education. Miss Dierker.

Designed to familiarize the student with song and listening material suitable for use in the elementary school. Study of material supplementary to that used in Music 442 and 443 with suggestions for its presentation.

Not open to students who have credit for Music 449 and 450.

610. Music in the Junior High School. Four credit hours. Spring Quarter. Three lectures and two periods of conference and observation each week. General prerequisites must include courses in school music for primary and intermediate grades. Mr. Leeder.

Materials, problem discussions, junior high school organizations. A course for supervisors of music or for special music teachers in the junior high school.

611. High School Music. Four credit hours. Autumn Quarter. Three lectures and two periods of conference and observation each week. General prerequisites must include courses in school music for primary and intermediate grades. Mr. Leeder.

Materials for musical organizations in the high school. Teaching of the theory of music in the high school. A course for supervisors of music or for special teachers of music in high schools.

†612. Supervision of Music in Elementary Schools. Three credit hours. Mr. Leeder.

A study of the specific problems of music supervision with special attention given to curriculum construction.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

†613. **Supervision of Music in Secondary Schools.** Three credit hours. Mr. Leeder.

This course is planned to meet the needs of supervisors of music in the senior and junior high schools. Special problems in the various phases of school music will be considered.

630. **Instrumentation.** Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include a course in harmony and an amount of applied music satisfactory to the instructor. Mr. Wilson.

Scoring for brass or wood-wind instruments in small combinations, and for full band.

632. **Instrumentation.** Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Music 630. Mr. Wilson.

Scoring for stringed instruments, for strings in combination with other instruments, and for full orchestra.

642. **Organization of the School Band and Orchestra: Conducting II.** Three credit hours. Winter Quarter. Three recitations each week. Mr. Weigel.

Organization and administration of the high school orchestra and band. Selection of materials; seating plans; preparation for rehearsal; rehearsal routine and conductor problems. Orchestral and band literature suitable for grade and high school use; the student will study and conduct these materials.

643. **Band and Orchestra Materials: Advanced Conducting III.** Three credit hours. Spring Quarter. Three lectures and drill periods each week. General prerequisites must include Music 630, 632, 642 and completion of an amount of the required courses in applied music satisfactory to the instructor. Mr. Weigel.

This course aims to develop the power to interpret the larger forms of orchestral literature and to read from full score; it includes problems of tempo, phrasing, nuance, balance, timbre, and special study of baton technique. Qualified students will be given opportunity to conduct one of the University Orchestras.

*648. **Choral Problems.** Three credit hours. General prerequisites must include the permission of the instructor. Mr. Diercks.

Study of the technique of handling choruses of high school age and above, including the study of tone interpretation and literature. A chorus of high school students, under the direction of the instructor, will be available for observation.

650. **Minor Problems.** One to five credit hours. All Quarters. In addition to the general prerequisites, the consent of the department must be obtained. All instructors.

Investigation of minor problems in the field of music.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. **Research in Music.** Autumn, Winter, and Spring Quarters.

Original investigation of theory and history or of practices in the field of teaching. Research is possible under the general heads: History, Mr. Hughes; Music Education, Mr. Leeder; Piano Methods, or certain musical aspects of psychology and aesthetics, Mr. Wilson; Instrumental Aspects of Music Education, Mr. Weigel; Vocal Music and Vocal Conducting, Mr. Diercks.

OPERATIVE DENTISTRY
Office, Hamilton Hall

PROFESSORS SEMANS, BOTTENHORN, GRAHAM, AND SNYDER, ASSOCIATE PROFESSORS JONES, KITCHIN, AND HEBBLE, ASSISTANT PROFESSORS STROSNIDER AND STARR

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include adequate preparation in technical courses concerned.

701-702-703. **Minor Problems in Operative Dentistry.** One to three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must

* Not given in 1936-1937.
† Not given during the academic year, 1936-1937.

include adequate preparation in technical courses concerned. Mr. Semans, Mr. Bottenhorn, Mr. Graham, Mr. Snyder, Mr. Hebble, Mr. Jones, Mr. Kitchin.

Students will have assigned to them special problems in Operative Dentistry.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include adequate preparation in technical and practical courses in operative dentistry.

950. Research in Operative Dentistry. Autumn, Winter, and Spring Quarters. Mr. Semans, Mr. Bottenhorn, Mr. Graham, Mr. Snyder, Mr. Hebble, Mr. Kitchin.

Research relating to and found in the various endeavors concerning treatment and restoration to normal condition of teeth and their contiguous parts.

PATHOLOGY
Office, Hamilton Hall

PROFESSOR SPOHR, ASSISTANT PROFESSORS REINHART AND DAVIDSON, MISS MILLER, MR. FROST

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Courses 600-626 inclusive are open only to students who are doubly registered in the College of Medicine and the Graduate School, to the extent of fifteen Quarter hours.

600. General Pathology. One credit hour. Spring Quarter. One lecture each week. General prerequisites must include Anatomy 624. Mr. Davidson.

An introduction to pathology, covering the history of pathology, and a general discussion of the etiology and nature of inflammations, degenerations, and tumors.

601. General Pathology. Three credit hours. Autumn Quarter. Two lecture and four laboratory hours each week. General prerequisites must include Pathology 600. Mr. Davidson, Mr. Frost.

Detailed study of inflammatory, degenerative, and neoplastic processes.

603. Clinical Pathology. Three credit hours. Winter Quarter. Two lectures and four laboratory hours each week. General prerequisites must include Bacteriology 641-642 and Physiological Chemistry 601-602. Mr. Spohr, Miss Miller.

Sputum, urine, spinal fluid, gastric contents, feces, animal parasites and ova, transudates and exudates, blood cultures, blood typing and matching, miscellaneous examinations.

604. Clinical Pathology. Three credit hours. Spring Quarter. Two lecture and four laboratory hours each week. General prerequisites must include Bacteriology 641-642 and Physiological Chemistry 601-602. Mr. Spohr, Miss Miller.

Blood, a study of unstained and stained specimens. Special blood pathology. Blood chemistry and functional tests. Sero-diagnostic methods.

605. Surgical Pathology. Two credit hours. Winter Quarter. One two-hour lecture each week. Mr. Reel.

A course correlating the symptomatology with the operative specimen.

606. Medical Pathology. Two credit hours. Winter Quarter. One two-hour lecture each week. Mr. Davidson.

A course correlating the symptomatology with morbid anatomy.

608-609-610. Advanced Pathology. Three to five credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Pathology 600, 601, 625, and 626. Mr. Davidson, Mr. Frost.

Autopsy technique.

611-612-613. Advanced Special Pathology. Three to five credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Pathology 600, 601, 625, 626, and Bacteriology 641-642. Mr. Davidson, Mr. Frost.

Minor problems in pathology.

614-615. Experimental Pathology. Three to five credit hours. Winter and Spring Quarters. General prerequisites must include Pathology 600, 601, 603-604, 625, 626, and Bacteriology 641-642. Mr. Spohr, Miss Miller.

Experimental infections and immunity as applied to medicine.

616-617-618. Advanced Clinical Pathology. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Pathology 603-604. Mr. Spohr, Miss Miller.

Study of materials collected in the hospital wards and out-patient departments.

625. Special Pathology. Three credit hours. Winter Quarter. Two lecture and four laboratory hours each week. General prerequisites must include Pathology 601. Mr. Davidson, Mr. Frost.

Pathology of the circulatory, respiratory, and gastro-intestinal systems.

Not open to students who have credit for Pathology 602.

626. Special Pathology. Three credit hours. Spring Quarter. Two lecture and four laboratory hours each week. General prerequisites must include Pathology 625. Mr. Davidson, Mr. Frost.

Pathology of the genito-urinary, reproductive, endocrine, reticulo-endothelial, central nervous, and skeletal systems.

653-654. Clinical Pathology. Three credit hours. Winter and Spring Quarters. One lecture and four laboratory hours each week. General prerequisites must include acceptable courses in bacteriology and chemistry. Mr. Spohr, Miss Miller.

A study of the changes in the blood, secretions, serums, and exudates of the body brought about by disease.

660. General Pathology. One credit hour. Spring Quarter. One lecture each week. General prerequisites must include Anatomy 611-612. Mr. Davidson.

An introduction to pathology, covering the history of pathology, and a general discussion of the etiology and nature of inflammations, degenerations, and tumors.

661. General Pathology. Three credit hours. Autumn Quarter. Two lecture and four laboratory hours each week. General prerequisites must include Pathology 660. Mr. Davidson, Mr. Frost.

Detailed study of inflammatory, degenerative, and neoplastic processes.

662. Special Pathology. Three credit hours. Winter Quarter. Two lecture and four laboratory hours each week. General prerequisites must include Pathology 661. Mr. Davidson, Mr. Frost.

Pathology of the circulatory, respiratory, and gastro-intestinal systems.

663. Special Pathology. Three credit hours. Spring Quarter. Two lectures and four laboratory hours each week. General prerequisites must include Pathology 662. Mr. Davidson, Mr. Frost.

Pathology of the genito-urinary, reproductive, endocrine, reticulo-endothelial, central nervous, and skeletal systems.

Not open to students who have credit for Pathology 626.

666. Pathologic Technique. Three credit hours. Winter Quarter. Six laboratory hours each week. General prerequisites must include Pathology 600 or 660.

The technique of preparation of frozen, paraffin, and celloidin tissue sections for microscopic study.

667. Pathologic Technique. Three credit hours. Spring Quarter. Six laboratory hours each week. General prerequisites must include Pathology 600 or 660.

The methods of preservation and mounting of specimens for museum purposes and the photography of gross specimens and microscopic preparations.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include adequate courses in pathology or clinical pathology completed in any acceptable medical school.

950. Research in Pathology. Autumn, Winter, and Spring Quarters.

Research problems in pathology under the direction of Mr. Davidson; in clinical pathology under Mr. Spohr and Miss Miller.

PHILOSOPHY

Office, 320 University Hall

PROFESSORS LEIGHTON, CHANDLER, AND AVEY, MR. LEVINGER, MR. REITHER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Courses bearing numbers 601 to 650 are historical; courses bearing numbers 651 to 700 are systematic.

601. Ancient Philosophy. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Mr. Chandler.

The development of philosophical thought from the Greeks to the Middle Ages. Most of the time is devoted to Greek Philosophy. A natural continuation of this course will be found in Philosophy 602; a more specialized treatment of medieval philosophy will be found in Philosophy 609.

602. Modern Philosophy to Kant. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Mr. Leighton.

The development of philosophical thought from the Renaissance to the end of the eighteenth century. A natural continuation of this course will be found in Philosophy 603.

603. Philosophy since 1800. Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. General prerequisites must include Philosophy 602. Mr. Leighton.

The development of philosophical thought from the beginning of the nineteenth century to the present. Special attention is given to the relations between philosophy, social movements, and literature.

606. American Philosophy. Three credit hours. Winter Quarter. General prerequisites must include ten hours in philosophy. Mr. Chandler.

A survey of the chief philosophical standpoints which have entered into the constitution of the American mind since colonial times; the life and works of the thinkers whose theories are considered.

***608. Philosophy and Poetry.** Three credit hours. Autumn Quarter. Given in alternate years. Mr. Chandler.

A discussion of Lucretius, Dante's "Divine Comedy," and Goethe's "Faust," for the light they throw on the history of thought and the nature of poetic excellence.

609. Medieval Philosophy. Three credit hours. Winter Quarter. General prerequisites must include Philosophy 601. Mr. Levinger.

The development of philosophical thought from the Church Fathers, through the Arabic, Jewish and scholastic writers, to the Renaissance. A natural continuation of this course will be found in Philosophy 602.

611. Origin and Development of Religious Ideas. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Mr. Avey.

A general survey of the fundamental ideas of the most important historical religions, including primitive beliefs: Brahmanism; Buddhism; Confucianism; Mohammedanism; Judaism; the various forms of Christianity.

* Not given in 1936-1937.

623. **Representative Greek Philosophers.** Five credit hours. Winter Quarter. General prerequisites must include Philosophy 601. Mr. Chandler.

A study of the more important Platonic dialogues.

625. **Representative Modern Philosophers.** Five credit hours. Winter Quarter. Given in alternate years. General prerequisites must include Philosophy 602. Mr. Reither.

A few representative works of classic thinkers of the period from Bacon and Descartes to Schopenhauer will be selected for intensive study.

†628. **The Platonic Tradition in European Thought.** Five credit hours.

A study of certain dialogues of Plato and of their influence upon aspects of Neo-Platonism, Christianity, the Florentine Academy, the Cambridge Platonists, the English poets.

649. **Formal Logic.** Five credit hours. Spring Quarter. General prerequisites must include a course in logic or consent of the instructor. Mr. Avey.

A study of the essentials of Aristotelian Logic; immediate and mediate inference (syllogism, hypotheticals, alternatives, etc.).

Not open to students who have credit for Philosophy 403.

652. **Philosophy of Science.** Three credit hours. Autumn Quarter. Given in alternate years. General prerequisites must include ten hours of philosophy and ten hours of natural science, or twenty-five hours of natural science. Mr. Leighton.

A study and critical discussion of a few general interpretations of the methods and basic assumptions of the natural and social sciences.

653. **Philosophy of Religion.** Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. General prerequisites must include five hours of philosophy. Students are advised to take Philosophy 611 as a background for this course. Mr. Leighton.

The physical and social nature of religion; a systematic examination of the fundamental religious conceptions—the idea of God in relation to the idea of the world, the idea of man, and the problem of human destiny.

656. **Principles of Social Ethics.** Three credit hours. Winter Quarter. General prerequisites must include one of the following: Philosophy 601, 602, Psychology 621, Education 603, 632, or ten hours of social science. Mr. Leighton.

Systematic development of a philosophy of human values, and its application to the chief forms and activities of civilized life—industrial and economic activities, the state, education, culture, and religion. Emphasis is laid on the social function of education as being the most important instrument of individual welfare and social progress.

Not open to students who have credit for Philosophy 406.

660. **Minor Problems.** Two to ten credit hours. Autumn, Winter, and Spring Quarters. Mr. Chandler, Mr. Avey, Mr. Reither.

Investigation of minor problems in the history of philosophy or systematic philosophy. Students ordinarily expect to take this course for from two to five credit hours, but Honors students may receive credit up to ten credit hours.

Topics for special study may be chosen from the following fields: ethics, logic, metaphysics, history of philosophy, religion (including Hebrew ideas and Christian origins), aesthetics.

*661. **Metaphysics of Knowledge and Nature.** Three credit hours. Autumn Quarter. Given in alternate years. General prerequisites must include two of the following: Philosophy 601, 602, 623, 625. Mr. Leighton.

A systematic consideration of the nature of scientific method and the scientific conception of nature in its bearings on the problems of man.

*662. **Metaphysics of Personality and Values.** Three credit hours. Winter Quarter. Given in alternate years. General prerequisites must include two of the following: Philosophy 601, 602, 603, 623, 625. Philosophy 661 will ordinarily precede this course. Mr. Leighton.

A systematic consideration of the nature of the self and society, the problem of values, and the problem of the meaning of existence as a whole.

† Not given during the academic year, 1936-1937.
* Not given in 1936-1937.

665. Philosophy of History. Three credit hours. Autumn Quarter. Given in alternate years. General prerequisites must include ten hours in philosophy and ten hours in the social sciences. Mr. Leighton.

A discussion of the place of history in the system of human knowledge, the humanistic significance of the historical attitude, the concepts of civilization, culture, development and progress. The aim of the course is to formulate a philosophy of culture.

Not open to students who have credit for Philosophy 820.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These general prerequisites include acceptable foundation courses either in psychology, logic and ethics, or in the history of philosophy, and in some cases in all of these subjects.

Prospective students are likewise strongly recommended to prepare for graduate work in this department by taking related courses in other departments. Psychology is regarded as related to all courses in philosophy. The following are suggested as related courses in other departments. For students of logic and metaphysics: mathematics, and natural sciences, especially general and theoretical physics, general and historical chemistry, and evolution (Zoology 509); for students of ethics and the philosophy of religion: sociology, politics, and history; for students of the history of philosophy: European history, and the history of Greek, German, English, and French literatures. Students proposing to specialize in philosophy must previously have completed the equivalent of at least eighteen Quarter-credit hours in philosophy and psychology. In case of students whose main interest is in ethics, two Quarters' work in the principles of sociology may be accepted in partial fulfillment of the above requirement.

Candidates for the Ph.D. degree in Philosophy are required to present themselves for general examinations in the elements of the entire subject, and also for more intensive examinations on six of the following subdivisions:

1. Greek philosophy through Aristotle
2. Graeco-Roman philosophy from the death of Aristotle to Plotinus
3. Modern philosophy through Kant
4. Modern philosophy from Kant to 1900 (including Kant)
5. Ethics
6. Social and Political Philosophy
7. Methodology of the Sciences
8. Symbolic logic
9. Theory of knowledge
10. Metaphysics
11. Aesthetics
12. History and Philosophy of religion

The candidate's choice of topics shall be made in consultation with the department and shall be relevant to the topic of his thesis.

Philosophy 661, 662, or their equivalent, are required of all candidates for the Doctor's degree.

801. Seminary in Systematic Philosophy. Three credit hours. Autumn Quarter. Mr. Avey.

802. Seminary in Systematic Philosophy. Three credit hours. Winter Quarter. Mr. Leighton.

803. Seminary in Systematic Philosophy. Three credit hours. Spring Quarter. Mr. Chandler.

950. Research in Philosophy. Autumn, Winter, and Spring Quarters. Mr. Leighton, Mr. Chandler, Mr. Avey.

PHONETICS

Office, 324 Derby Hall

PROFESSOR RUSSELL, ASSISTANT PROFESSOR MASON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

604. Clinical Practice in Speech Correction. Five credit hours. Autumn Quarter. General prerequisites must include ten hours in phonetics and ten hours in psychology. Mr. Russell.

Actual clinical practice in speech correction and training of visual hearing. The student will be given opportunity to study and work with a wide range of speech and hearing cases at the Children's Hospital, in the University Clinic, and the Freshman Week Health Line. To make arrangements, he should, if possible, communicate with the Department well before the opening of the Quarter.

605. Standard American Pronunciation. Five credit hours. Winter Quarter. General prerequisites must include ten hours in phonetics, a course in public speaking and a course in English words. Mr. Emsley.

Norms of cultured speech, deviations therefrom, and their historical origin.

606. Lip-reading Techniques. Five credit hours. Spring Quarter. General prerequisites must include fifteen hours in phonetics and ten hours in English or public speaking. Miss Mason.

700. Human Speech: Minor Research. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Conference, library, and laboratory work. General prerequisites must include satisfactory courses in the field of the problem undertaken. A student may repeat this course and spend such time as the problem calls for during any Quarter. Mr. Russell.

This course is designed to permit any properly qualified person to avail himself of the library and laboratory facilities of the University for carrying out a minor or preliminary investigation, or for adding to his knowledge and technique in any phase of the study of human speech and sound as related thereto, or of the mechanism involved in its production, or of its known defects and their correction.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Phonetics. Autumn, Winter, and Spring Quarters. Conference, library, and laboratory work. General prerequisites must include acceptable courses in the chosen field of research. The student must show demonstrated ability to pursue independent investigation in that field. Credit dependent on the time spent and the type of work done. Mr. Russell.

Designed for those desiring to pursue advanced research in the general field of scientific phonetics.

PHOTOGRAPHY

Office, 4 Brown Hall

PROFESSOR HASKETT, ASSISTANT PROFESSOR DAVIS

725. Scientific Photography. Three credit hours. Winter Quarter. Two lectures and recitations and two three-hour laboratory periods each week. General prerequisites must include a year of elementary or general chemistry. Mr. Haskett, Mr. Davis.

An introductory course in scientific and general photography for students interested in physics, chemistry, astronomy, and other scientific fields; theory of photographic processes and

photographic materials; also a general course in the photography of buildings, landscapes, interiors, lantern slides, printing, etc.

Not open to students who have credit for Photography 611.

750. Advanced Photography. Three credit hours. Winter Quarter. General prerequisites must include Photography 611, 650, or 725. Mr. Haskett, Mr. Davis.

An advanced course with special emphasis on the applications of photography in the field of science, including enlarging, retouching, coloring, working on negatives, prints, and lantern slides, together with the theory involved.

PHYSICAL EDUCATION

MEN'S DIVISION
Office, Physical Education Building

PROFESSORS ST. JOHN, D. OBERTEUFFER, AND SCHMIDT, ASSOCIATE PROFESSORS METCALF, WOOD, AND ASHBROOK, ASSISTANT PROFESSORS DUFFEE AND STALEY

WOMEN'S DIVISION
Office, Pomerene Hall

PROFESSORS PALMER AND K. OBERTEUFFER, ASSOCIATE PROFESSOR SUMPTION, ASSISTANT PROFESSORS GILMAN, STEIN, AND WATSON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

†601. Principles of Football Coaching and Management (Men). Three credit hours. Prerequisite, coaching experience.

A course for advanced students of football. The course will consider the principles underlying various types of football strategy, the designing of plays, methods of teaching and controlling players; also, special problems of management, such as those connected with selecting, handling equipment, and making trips.

615. Problems in Intramural Sports (Men and Women). Two credit hours. Spring Quarter. Two class meetings each week. Mr. Wood.

A critical analysis of intramural sports programs with a view to their justification from the standpoint of objectives, age level and contribution to the general welfare of the students participating. Problems of policy and administration of programs on the elementary, secondary, and college levels will be studied. Lectures, readings, reports, and discussions.

Not open to students who have credit for Physical Education 815.

621. Principles of Physical Education (Men and Women). Five credit hours. Winter Quarter. General prerequisites must include ten hours of physiology or equivalent biological training and courses in the theory and practice of physical education, or equivalent. Mrs. Oberteuffer.

The nature of physical education, especially in relation to overlapping fields, such as health education and community recreation, and to education in general. A critical analysis of various objectives advanced; a review, with applications to physical education of modern conceptions of education and of modern principles in psychology and physiology.

Not open to students who have credit for Physical Education 683.

625. Tests and Measurements in Physical Education (Men and Women). Three credit hours. Winter Quarter. Two lectures and one two-hour laboratory period each week. Mr. Ashbrook.

A critical study of various specific tests and types of tests, including those designed to measure neuromuscular capacity or proficiency. Among the tests studied will be those of Schneider, Brace and Rogers, and a number of efficiency standards in use in public school systems and elsewhere.

† Not given during the academic year, 1936-1937.

630. Individual Physical Education (Men and Women). Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include an elementary course in individual physical education. Section for men, Mr. Metcalf; section for women, Miss Gilman.

Making a physical education program meet the needs of handicapped individuals, fundamental principles in the selection and adaptation of activities in corrective procedures, abnormal physical conditions that come to the care or attention of the physical educator, methods of examining and determining individual needs, activity program of both formal and informal character to meet the needs in schools and colleges, will be the problems dealt with in this course. The problems will be discussed in the light of modern objectives of education and particularly individual physical education. There will be lectures, recitations, demonstrations, term projects, and occasional trips to various orthopedic hospitals for observation purposes.

631. Dance Composition (Men and Women.) Three to five credit hours. Winter Quarter. General prerequisites must include a course in elementary interpretative dancing, Permission of instructor must be obtained. Miss Watson.

Lectures, readings, and discussions of the dance as an art. The study of body movement as an expressive medium based upon analysis of old and new dance forms. Practice in program-making and opportunity to assist in recital production.

632. Rhythmic Analysis (Men and Women). Three credit hours. Spring Quarter. Two lectures and three laboratory meetings each week. General prerequisites must include one Quarter of advanced dancing, elementary rhythmic analysis, elementary interpretative dancing, or the equivalent. Miss Watson.

A study of the rhythmic pattern of body movement in more complex dance forms; the kinesthetic theory of rhythmic perception, and the development of a discriminating sense of rhythmic values as carried into individual and group composition.

635. Problems in Sports for Girls and Women (Men and Women). Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include Physical Education 621. Miss Palmer.

A discussion of outstanding problems in the organization of a sports program for girls and women: policies, activities, types of competition, point systems, awards, and athletic associations.

641. Personal Health Problems (Men and Women). Three credit hours. Spring Quarter. Three lectures and recitations each week. Mr. Oberteuffer.

A study of the problems of living as they involve the health of the adult. Problems of the adjustment of the individual to conditions of rural and urban life. An informational and problems course. Serves also as a basic subject matter course for advanced study in health education.

643. Principles of Health Education (Men and Women). Three credit hours. Autumn Quarter. Three lectures each week. Mr. Oberteuffer.

A basic survey of educational opportunities in health found in the various aspects of school life. Principles underlying the school health program. Survey of available teaching materials used in the classroom. Includes a study of official and non-official health agencies and their bearing upon the school health program. No discussion of the techniques of teaching.

644. The Teaching of Health in Secondary Schools and Colleges (Men and Women). Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, Physical Education 643 or the equivalent. Miss Palmer.

How to teach and what to offer in hygiene or health classes. Discussions of the methods and subject matter used in presenting hygiene to students. Includes a study of the opportunities for integration of health material with other subjects of the organized curriculum.

***646. Professional Preparation of Teachers in Physical and Health Education (Men and Women).** Three credit hours. Autumn Quarter. Three class meetings each week. Permission of the instructor must be obtained.

The principles underlying the professional training of teachers in physical and health education; curriculum construction; selection of candidates; supervised teaching; staff personnel; problems pertaining to professional students.

647. The Teaching of Physical Education. Three credit hours. Winter Quarter. Two lectures and three laboratory periods each week. Physical Education 621 must be included in the general prerequisites or must be taken concurrently. Mr. Staley, Mr. Ashbrook.

Lectures, discussions, demonstrations, and practice. Selection and organization of subject matter in different types of physical education classes. Techniques of instruction. Use of equip-

* Not given in 1936-1937.

ment. Modification of subject matter and procedure to meet varying school and community conditions.

*648. The Teaching of Physical Education. Three credit hours. Spring Quarter. Two lectures and three laboratory periods each week. Physical Education 621 must be included in the general prerequisites or must be taken concurrently. Mr. Staley, Mr. Ashbrook.

A continuation of Physical Education 647.

649. Camping: Its Organization and Administration (Men and Women). Three credit hours. Spring Quarter. Lectures, readings, and field demonstrations. Three lectures each week. Occasional Saturday mornings will be scheduled for field trips. The course is an elective given jointly by the Departments of Physical Education and Social Administration. Prerequisite for Social Administration students, Sociology 645. Prerequisite for Physical Education students, ten hours of sociology, and courses in the theory and practice of physical education. Mr. Metcalf.

The organization and direction of camps, particularly summer camps for boys and girls. Special attention is given to the social and educational program for adolescents. Designed for those preparing for the direction of boys' and girls' work. Practical demonstrations in camping will be included.

This course is the same as Social Administration 649.

651. Minor Problems in Physical Education (Men and Women). One to four credit hours. Autumn, Winter, and Spring Quarters. Permission of the adviser must be obtained. The staff.

Investigation of minor problems in the field of physical and health education.

652. Survey and Clinical Practice in the Care of the Physically Handicapped (Men and Women). Three credit hours. Winter Quarter. Two lectures and three laboratory periods each week. General prerequisites must include Physical Education 630, Physiology 620, or equivalent. Consent of instructor must be obtained. Advised background in child psychology and abnormal psychology. Mr. Metcalf, Miss Gilman.

Observation of orthopedic diagnosis and surgery, physiotherapy methods in various educational and medical centers. Clinical experience under the supervision of the orthopedic surgeon in the after care of infantile paralysis, spastic paralysis, post-operative, scoliosis, and other orthopedic deformities. Laboratory, lectures, readings, reports, and discussions.

682. Organization and Administration of Physical Education (Men and Women). Five credit hours. Winter Quarter. Five lectures each week. General prerequisites must include Physical Education 621 or equivalent. Mr. St. John, Miss Palmer.

The policies in the organization and administration of the Physical Education program: classification of students, staff, teaching load, time schedule, finances, etc. The administration of the Physical Education plant; gymnasium, locker rooms, swimming pool, equipment, records. Intra-school relationships.

685. Prevention and Care of Injuries (Men). Three credit hours. Autumn Quarter. Three lectures each week. Mr. Duffee.

A consideration of the methods of prevention and care of injuries occurring in physical education and competitive sports. The course also includes a discussion of the conditioning of men for athletic contests.

691. Kinesiology (Men and Women). Three credit hours. Autumn Quarter. Four lecture-laboratory periods each week. General prerequisites must include acceptable courses in human anatomy and physiology. Section for men, Mr. Metcalf; section for women, Miss Stein.

The science of bodily movement. Basis for: prescription of activities in individual physical education; identification of common athletic injuries; form and style in athletic performance; analysis of coordination in sports, gymnastics, and ordinary activities of daily life.

692. The School Health Service (Men and Women). Three credit hours. Spring Quarter. Three lectures each week. Mr. Duffee.

A consideration of the problems in connection with the health of the school child and teacher. Discussions and reports relating to medical inspection, physical examinations, symp-

* Not given in 1936-1937.

toms and control of common school diseases, malnutrition, and the health environment of the school child.

NOTE: For courses in the History of Physical and Health Education, see the Department of Education, Course 642.

NOTE: For course in the Physiology of Exercise see the Department of Physiology, Course 620.

NOTE: For course in the Administration of Physical and Health Education see the Department of Education, Course 731.

NOTE: For course in Health Education for Teachers see the Department of Education, Course 664.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

801. Seminary in Health Education (Men and Women). Two credit hours. Autumn Quarter. The staff.

Discussion sections will be arranged for small groups according to school and institutional levels.

Not open to students who have credit for Physical Education 628.

802. Seminary in Physical Education (Men and Women). Two credit hours. Winter Quarter. The staff.

Not open to students who have credit for Physical Education 628.

803. Seminary in Athletics (Men and Women). Two credit hours. Spring Quarter. The staff.

Not open to students who have credit for Physical Education 628.

805. Physical Education in Schools and Colleges (Men and Women). Three credit hours. Autumn Quarter. Three lectures and discussions each week. General prerequisites must include Physical Education 621 or its equivalent. Mr. Oberteuffer.

An analysis of existing school and college programs considered in the light of acceptable practices in school administration. Will involve some case studies with summaries drawn in terms of principles. Arranged for students with teaching experience.

810. Scientific Studies in Physical Education (Men and Women). Three credit hours. Autumn Quarter. Three lectures each week. Mr. Ashbrook.

A survey and evaluation of published reports of research in the field of physical education.

816. Problems in Interscholastic and Intercollegiate Athletics (Men and Women). Three credit hours. Spring Quarter. Three lecture and recitation hours each week. Mr. St. John, Mr. Oberteuffer.

The relation of athletics to education; problems of athletic organization; eligibility; finance; current trends and developments in management and purpose; public relations.

820. Problems in Health Education (Men and Women). Three credit hours. Spring Quarter. Three lecture and recitation periods each week. Mr. Oberteuffer.

Problems of the relation of medicine to education; the physician in the school; legal aspects of the school health program; social medicine; trends and developments in mental and social hygiene. Individual and group readings and forum discussions.

826. Supervision of Physical and Health Education (Men and Women). Four credit hours. Autumn Quarter. Three lectures each week. Mr. Oberteuffer.

A study of the opportunities and problems of the supervisor in city, county, and state school systems; the relations of the supervisor to the superintendent and to the teacher; rating teachers; methods of assisting teachers. Separate units of the course will consider supervisory problems unique to the sexes.

Not open to students who have credit for Physical Education 626.

950. Research in Physical and Health Education (Men and Women). Autumn, Winter, and Spring Quarters. The staff.

PHYSICS AND ASTRONOMY

PHYSICS

Office, 107 Mendenhall Laboratory

PROFESSORS ALPHEUS W. SMITH, BLAKE, LANDE, AND THOMAS, ASSOCIATE PROFESSORS ALVA W. SMITH, GREEN, POOL, AND NIELSEN, ASSISTANT PROFESSORS HEIL, ZUMSTEIN, KNAUSS, BENNETT, AND HESTHAL, MR. SHORTLEY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These general prerequisites include fundamental courses in physics and mathematics.

*607. **Physical Optics.** Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Zumstein.

Lenses; systems of lenses; defects of images and their correction; diffraction; interference; polarization; optical rotation; dispersion and anomalous dispersion; optical instruments such as plane grating, concave grating; prism spectroscope for visible ultra-violet and infra-red; interferometers; spectrophotometers; and microphotometers.

608. **Advanced Electricity.** Four credit hours. Autumn Quarter. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Mr. Bennett.

An introductory course in the mathematical theory of electricity and magnetism.

609. **Molecular Physics and Heat.** Four credit hours. Autumn Quarter. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Mr. Shortley.

A study of the kinetic theory of gases and related topics.

610. **Conduction of Electricity through Gases and Radioactivity.** Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Mr. Heil.

An introductory course on the passage of electricity through gases and evacuated tubes, ionic velocities, photo-electricity, cathode rays and positive rays, radioactivity, elementary introduction to electron theory of matter, etc.

611. **Modern Spectroscopy.** Four credit hours. Spring Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Hesthal.

A discussion of recent progress in spectroscopy covering the following topics; series lines in spectra, Ritz principle of combination, Bohr's explanation, neutral and ionized states, ionization potential, types of series, electron orbits, generalization of Bohr's assumption, total and partial quantum numbers, Stark effect, intensity of lines; recent infra-red work; new work in ultra-violet; rest-strahlen, and focal isolation; Zeeman effect; absorption spectra, "raies ultimes".

612. **Periodic and Transient Electric Currents.** Four credit hours. Spring Quarter. Three lectures and recitations and one two-hour laboratory period each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Alva Smith.

Transient and stationary states in electrical circuits containing impulsive or periodic electromotive forces treated by the methods of differential equations and vector analysis; periodic and aperiodic currents in single circuits with resistance, inductance and capacity in series or parallel; coupled circuits; resonance phenomena; damped oscillations; theory of alternating current bridge measurements; pulsating currents; Fourier's analysis of periodic non-sinusoidal wave forms; electromagnetic radiation.

615. **Introduction to Nuclear Physics.** Four credit hours. Winter Quarter. General prerequisites must include calculus and one year of college physics. Mr. Pool.

Review of recent experimental methods and data on transmutation of the elements by bombardment with protons, deutons, neutrons, and alpha rays; artificial radioactivity; detection of nuclear disintegration products.

* Not given in 1936-1937.

616. Advanced Physical Laboratory. Three to twenty-four credit hours. All Quarters. Two three-hour laboratory periods each week. General prerequisites must include one year of college physics. Mr. Heil.

This course is intended to give the advanced student in science practice in precise physical measurements, involving the use of high grade mechanical, optical, electrical and thermal instruments.

The work undertaken will be elected from the following topics:

(a) **Mechanics and Heat.** Exact measurements involving determinations of elasticities of solids, moments of inertia, torsional rigidity, torsional hysteresis "g" by physical pendulum, coefficient of viscosity, density of gases and vapors, hygrometry, specific heats, heat values of gases, thermoelectromotive forces, etc.

(b) **Advanced Optical Measurements.** Exact determination of indices of refraction by means of spectrometers, wave lengths by means of ruled gratings and interferometers, dispersion, polarization, absorption, analysis of spectra, etc.

(c) **Advanced Electrical Measurements.** Exact measurements of currents, resistances, electromotive forces, magnetic permeability, capacity and inductance, transient phenomena involving the determination of time constants of circuits; fundamental alternating current measurements; the use of the oscillograph in the study of alternating and transient currents.

(d) **Advanced Measurements in Ionization and Radioactivity.** Use of electrometers and electroscopes for exact measurements of currents in gases, saturation currents, discharge of electricity and ionizing properties of radioactive materials, absorption of radiation: ionizing properties of flames and incandescent solids; characteristic curves of two and three electrode tubes and applications, photo-electricity, etc.

(e) **Pyrometry and High Temperature Measurements.** Thermo-electric pyrometers, resistance thermometers, optical pyrometers, total radiation pyrometers, temperature recorders and controlling devices, transition points and thermal analysis at high temperatures.

(f) **Acoustics.** Measurements on characteristics of speech sounds, limits of audition, masking effect of different sounds, binaural beats, acuity of hearing, acoustic filters, reflection and absorption of sound, reverberations, resonance in tubes and pipes, velocity of sound in different media.

Any one of the above topics may be selected during any Quarter with the exception of topic (d), which is offered only during the Winter Quarter.

A student may repeat this course until he has obtained a maximum of twenty-four credit hours. Only three credit hours may be taken during any Quarter except during the Summer Quarter, when six credit hours may be obtained. A student may accumulate not more than six credit hours in any *one* of the above topics.

†617. Spectroscopic Instruments and Methods. Four credit hours. Four lectures and recitations each week. General prerequisites must include three Quarters of college physics and calculus concurrent.

Characteristics and uses of different types of spectrographs for visible, ultra-violet and infra-red regions of the spectrum; interferometers, spectrophotometers, and microphotometers; spectroscopic and photometric methods and their technical applications; light sources for spectroscopy and photometry; elementary survey of spectroscopic data.

†619. The Structure of Molecules. Four credit hours. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics.

Infra-red spectra and molecular structure; molecular potential energy curves and vibration levels; normal modes of vibrations of polyatomic molecules; rotation of molecules; selection rules and degeneracies of molecular energy levels; specific heats; electronic configurations in molecules; the nature of the chemical bond; electric moments; dielectric constants; quantum mechanical analysis of molecular phenomena.

620. X-rays and Atomic Structure. Four credit hours. Autumn Quarter. Four lectures and recitations each week. Prerequisite, calculus and three Quarters of college physics. Mr. Zumstein.

Production, measurement and effects of X-rays, including gamma rays; classical electron theory of the reflection, refraction, absorption and scattering of X-rays; quantum theory of the origin of X-ray spectra and structure of heavy atoms.

621. Acoustics. Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Knauss.

A discussion of wave motion, forced vibrations, origin, propagation, velocity, interference, diffraction, resonance and energy relations of sound waves, vibration of strings and organ pipes, speech sounds, acoustics of buildings, etc.

† Not given during the academic year, 1936-1937.

622. Thermionics and High Vacuum Phenomena. Four credit hours. Spring Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Heil.

An introductory course in the physical theories of thermionic emission; the discharge of electricity from incandescent solids in gases and high vacua; the effect of space charge and electrode potentials on currents in vacuum tubes; the methods of production and measurement of high vacua; the application of thermionic devices to rectification of alternating currents and to the production and detection of oscillations; use of thermionic devices for measurement of very low pressures; the application of multiple electrode tubes to the study of radiation potentials and ionization potentials.

623-624-625. Introduction to Theoretical Physics. Three credit hours each Quarter. Autumn, Winter, Spring. Three lectures and recitations each week. General prerequisites must include Mathematics 601 and 611 and three Quarters of college physics or their equivalents. Mr. Thomas.

This course is an introductory mathematical survey of the field of theoretical physics with emphasis on the application of mathematical methods to the solution of physical problems. The content of the course is selected from the following topics: dynamics of a particle, dynamics of rigid and deformable bodies, hydrodynamics of perfect and elastic fluids, dynamical theory of gases, electrostatics and electromagnetics, transient and alternating currents, electromagnetic waves along wires and in free space.

630. Minor Problems in Physics. Three to fifteen credit hours. Any Quarter. Conference, library, and laboratory work. General prerequisites must include satisfactory advanced courses in general experimental and theoretical physics. All instructors.

This course is designed to permit any properly qualified student to avail himself of the library and laboratory facilities of the department for adding to his knowledge and techniques in some subject in physics, for repeating classical physical experiments, or for carrying out minor investigations. After consulting with the chairman of the department the student may elect to work on any of the following topics: (a) acoustics; (b) chromatic photometry; (c) electrical and magnetic measurements at different frequencies; (d) high vacuum phenomena and techniques; (e) photoelectricity and thermionics; (f) pyrometry; (g) radioactivity and atomic disintegration; (h) visible, ultra-violet, and infra-red spectroscopy; (i) X-rays and crystal structure.

†640. Modern Views Concerning the Physical Universe. Three credit hours. This course cannot be counted toward a major in physics. General prerequisites must include one year of college physics. Mr. Hesthal.

This course is intended primarily for teachers of physics and chemistry in the secondary schools. It presents in a simple, non-mathematical manner recent advances in physics and astronomy, with numerous illustrations and applications. The subject matter is organized in a way to give a comprehensive picture of the physical universe as revealed by modern physics and astronomy.

†641. Development of Classical and Modern Physics. Three credit hours. This course cannot be counted toward a major in physics. General prerequisites must include one year of college physics. Mr. Hesthal.

This course is intended primarily for teachers of physics and chemistry in secondary schools. Its purpose is (1) to give a historical account of the development of physics and astronomy, (2) to discuss the factors which have given direction and impetus to this development, and (3) to interpret the educational, social, and economic results of the physical sciences.

***654. X-rays and Crystal Structure.** Three credit hours. Winter Quarter. Three lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Given in alternate years. Mr. Blake, Mr. McCaughey, Mr. Mack, Mr. Harris.

This course is designed for those students of physics, chemistry, and mineralogy who intend to do research work in crystal structures and X-ray analysis.

This course is the same as Mineralogy 654 and Chemistry 654.

Not open to students who have credit for Physics 814.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 684.

For requirements for degree of Master of Arts with Physics and Education as fields of specialization, see page 29.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

A reading knowledge of German and French is highly desirable.

801. Electromagnetic Theory of Light. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include Physics 607 and 625 or their equivalent. Mr. Landé.

This course deals with propagation of waves in crystals, circular and elliptic polarization, theory of reflection and refraction, Maxwell's theory, Hertz's verification, boundary conditions, theories of dispersion, optical properties of metals, magneto-optics.

***803-*804. Thermodynamics.** Three credit hours. Winter and Spring Quarters. General prerequisites must include Physics 625 or its equivalent. Mr. Landé.

This course deals with the fundamental principles of thermo-dynamics and their application to such topics as osmotic pressure, electrolytic conduction, diluted and concentrated solutions, the phase rule, chemical equilibrium, metastability of matter, Nernst's heat theorem and the modern theories of specific heats.

805. Theory of Electricity and Magnetism. Three credit hours. Winter Quarter. General prerequisites must include Physics 625 or its equivalent. Mr. Landé.

This course deals with the electromagnetic theory as originally developed by Maxwell. It includes also a consideration of the modern theories of electricity and magnetism. It is essentially a mathematical course.

806. Theory of Electricity and Magnetism. Three credit hours. Spring Quarter. Mr. Landé.

A continuation of Physics 805.

809. General Theory of Small Oscillations. Three credit hours. Autumn Quarter. General prerequisites must include Physics 625 or its equivalent. Mr. Blake.

The general theory of small oscillations will be developed both for free and forced oscillations, with and without damping. The properties of the coefficients of inertia, resistance and elastance will be studied and illustrated. The properties of normal functions will be studied.

810. Applications of the Theory of Oscillations. Three credit hours. Winter Quarter. General prerequisites must include Physics 809. Mr. Blake.

The theory of a loaded string and the conditions under which it stimulates a uniform string will be studied and applied to modern telephone engineering. The vibrations of square and circular membranes will be studied and applied.

811. Applications of the Theory of Oscillations. Three credit hours. Spring Quarter. General prerequisites must include Physics 810. Mr. Blake.

The theory of thermionic oscillators will be developed and applied, electrical and acoustical filters will be studied and some of the theory of transmission networks will be developed.

***813. Line Spectra and Atomic Structure.** Three credit hours. Autumn Quarter. Three lectures and recitations each week. General prerequisites must include Physics 610 and 611 or their equivalent. Mr. Green.

Interpretation of spectra series, stationary states and term values, spinning electrons and fine line structure, vector models of atoms, Zeeman effect and Stark effect, intensity and polarization of spectral lines, Pauli's exclusion principle, hyperfine structure and nuclear moment.

***815. X-rays and Quantum Theory of Atomic Structure.** Three credit hours. Spring Quarter. Three lectures and recitations each week. General prerequisites must include Physics 610 and 620. Mr. Blake.

The Thomas-Fermi distribution of electrons in atoms and the Hartee distribution in relation to atomic scattering; the theory of coherent and incoherent scattering; the dimensions of atoms and molecules as determined by X-ray and electronic scattering; the fine line structure of emission lines and of absorption limits. The use of X-rays in the study of molecular structure.

817-818-819. Quantum and Wave Mechanics. Three credit hours. Autumn, Winter, and Spring Quarters. Three lectures each week. General prerequisites must include Physics 625 or its equivalent. Mr. Landé.

Wave mechanics of Schroedinger and deBroglie; matrix mechanics of Born, Heisenberg,

* Not given in 1936-1937.

and Jordan; relation to classical mechanics; atomic models and spectral lines; band-spectra and vibrations of complex molecules; applications of wave mechanics to the diatomic oscillator-rotator; intensity relations; perturbation theory; degeneracy in spectra; homopolar molecules and nuclear spin; general transformation theory of Dirac and Weyl with deduction of wave equation; applications to emission and absorption; many electron problems; Heisenberg's uncertainty principle.

824. Statistical Mechanics. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include Physics 625 or its equivalent. Mr. Thomas.

Basis of statistical mechanics and its relation to thermodynamics; vapor pressure; rate of evaporation; fluctuations and Brownian movements; Einstein-Bose statistics; the Pauli-principle and Fermi-Dirac statistics; applications to temperature-radiations; specific heats of gases and crystals; thermionics and the theory of metallic conduction.

825. Applications of Wave Mechanics to Physico-Chemical Phenomena. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include Physics 824. Mr. Thomas.

Heitler and London's theory of homopolar compounds; dielectric constants and magnetic susceptibilities of gases; paramagnetism of rare earths; Heisenberg's theory of ferromagnetism; collision problems; ionization by radiation and by collision; radioactive processes.

826. Problems in Astrophysics. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Physics 825. Mr. Thomas.

Contributions of theoretical physics to the solution of major problems in astrophysics; emphasis on the application of the quantum theory to stellar phenomena; a discussion of such problems as: thermodynamic methods, radioactive equilibrium, cosmic rays, radiation pressure, statistical mechanics and physical properties of gaseous media, Milne's theory of stellar chromospheres, Eddington's theory of stellar interiors and Jean's theory of the structure of stars.

851. Band Spectra and Related Topics. Three credit hours. Winter Quarter. Three lectures and recitations each week. General prerequisites must include Physics 610 and 611.

Classification of molecular spectra; electronic and oscillation bands; Zeeman effect and isotrope effect in band spectra; Raman effect; formation and dissociation of molecules; fluorescence; nature of certain chemical reactions in gases; applications of quantum mechanics to band spectra.

852. Infra-red Molecular Spectra. Three credit hours. Spring Quarter. Three lectures and recitations each week. General prerequisites must include Physics 610 and 611. Mr. Nielsen.

An interpretation of various types of infra-red bands in terms of vibrating and rotating molecular models; a detailed treatment of symmetric and asymmetric rotators on the basis of both classical and quantum mechanics, intensities of vibration bands and rotation lines; applications of data on infra-red molecular spectra to related chemical and physical phenomena.

†**860. Mathematical Physics.** Three credit hours. Winter Quarter. General prerequisites must include Physics 610 and Mathematics 601 and 611.

Continuation of treatment of mathematical methods considered in Mathematics 831-832 with special emphasis on the applications of the general principles of mechanics to the fields of hydrodynamics, electrodynamics, elasticity, theory of potential and conduction of heat; solution of particular physical problems by the methods series and singularities.

*861. **Mathematical Physics.** Three credit hours. Spring Quarter. General prerequisites must include Physics 860. Mr. Thomas.

Continuation of Physics 860.

950. Research in Physics. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in physics and mathematics. The student may spend a part or all of his time on his chosen field of research. This course is intended primarily to meet the needs of students who must complete either a thesis or a dissertation as part of the requirements for a degree. Mr. Alpheus W. Smith, Mr. Blake, Mr. Landé, Mr. Alva W. Smith, Mr. Thomas, Mr. Heil, Mr. Green, Mr. Zumstein, Mr. Pool, Mr. Knauss, Mr. Hesthal, Mr. Nielsen, Mr. Bennett, Mr. Shortley.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

ASTRONOMY

Office, Emerson McMillin Observatory

PROFESSOR MANSON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

605. Introduction to Celestial Mechanics. Four credit hours. Winter Quarter. Four lecture and recitation periods each week. General prerequisites must include three Quarters of calculus and ten Quarter hours of astronomy or ten Quarter hours of college physics. Mr. Manson.

A discussion of rectilinear motion under the law of inverse squares and the law of direct distance; potential and attraction; the problem of two bodies; the general integrals of the problem of 'n' bodies; the restricted problem of three bodies; introductory discussion of lunar theory.

606. Orbits. Four credit hours. Spring Quarter. Four lecture and recitation periods each week. General prerequisites must include Astronomy 605 or its equivalent. Mr. Manson.

A discussion of the computation of positions of planets or comets in elliptical and parabolic orbits. The computation of orbits of planets and comets. Perturbations. Orbits of binary stars.

611. Minor Problems in Astronomy. Three to nine credit hours. Autumn, Winter, and Spring Quarters. Conference, library and laboratory work. General prerequisites must include a course in stellar astronomy. A student may repeat this course until he has earned a total of nine credit hours but not more than three credit hours may be taken in one Quarter. Mr. Manson.

This course is designed to permit properly qualified students to avail themselves of the facilities of the Observatory to work independently on a special problem in practical astronomy, to develop the necessary techniques for the successful use of astronomical instruments and to get some acquaintance with the methods of astronomical research. Each problem must be selected after consultation with the instructor in charge of the course.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Astronomy and Astrophysics at the Perkins Observatory. Autumn, Winter, and Spring Quarters. General prerequisites must include acceptable courses in astronomy, mathematics, and physics. In accordance with an arrangement made by the Boards of Trustees of The Ohio State University and of Ohio Wesleyan University, students registered in the Graduate School may carry on their research work at the Perkins Observatory of Ohio Wesleyan University under the guidance of the Director of that Observatory. Subject of research to be chosen after consultation with the Director. The course may be repeated as often as necessary in pursuit of any special research. (See page 11 for research facilities offered by the Perkins Observatory.)

PHYSIOLOGICAL CHEMISTRY, PHARMACOLOGY, AND MATERIA MEDICA

Office, Hamilton Hall

PROFESSOR SMITH, ASSOCIATE PROFESSOR BROWN, ASSISTANT PROFESSOR WIKOFF, MR. BOSWORTH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include fundamental courses in general chemistry, qualitative and quantitative analysis and organic chemistry.

Courses 601, 602 and 671 are open only to students doubly registered in the College of Medicine and the Graduate School. Courses 632 and 633 are open only to students doubly registered in the College of Dentistry and the Graduate School. (See page 24.)

PHYSIOLOGICAL CHEMISTRY

601. Physiological Chemistry. Five credit hours. Autumn Quarter. Two lectures, one quiz, and six laboratory hours each week. General prerequisites must include acceptable courses in general chemistry, quantitative analysis and organic chemistry. Mr. Smith, Mr. Brown.

The chemistry of carbohydrates, lipins, and proteins.

602. Physiological Chemistry. Five credit hours. Winter Quarter. Two lectures, one quiz, and six laboratory hours each week. General prerequisites must include Physiological Chemistry 601. Mr. Smith, Mr. Brown.

The chemistry of digestion, metabolism, and excretion.

611. Physiological Chemistry. Five credit hours. Autumn Quarter. Three lecture-quiz hours and six laboratory hours each week. General prerequisites must include quantitative analysis and Chemistry 647, 648, 649, 650. Miss Wikoff.

The chemistry of carbohydrates, lipins, and proteins.

Not open to students who have credit for Physiological Chemistry 601. Not available for graduate credit for students majoring in Physiological Chemistry.

612. Physiological Chemistry. Five credit hours. Winter Quarter. Three lecture-quiz hours and six laboratory hours each week. General prerequisites must include Physiological Chemistry 611. Miss Wikoff.

The chemistry of digestion, metabolism, and excretion.

Not open to students who have credit for Physiological Chemistry 602. Not available for graduate credit for students specializing in Physiological Chemistry.

613. Quantitative Methods of Blood Analysis. Three credit hours. Spring Quarter. One lecture and six laboratory hours each week. General prerequisites must include Physiological Chemistry 612. Miss Wikoff.

Determination of important constituents of the blood.

Not open to students who have credit for Physiological Chemistry 603.

614. Biochemical Methods of Analysis. Five credit hours. Autumn Quarter. Two hours of lecture or quiz and nine laboratory hours each week. General prerequisites must include Physiological Chemistry 612. Miss Wikoff.

The quantitative analysis of the proteins, fats, and carbohydrates. Special methods for the analysis of biological materials.

618. Toxicology and Legal Medicine. Two or four credit hours. Autumn Quarter. Two lectures and six laboratory hours each week. For four credit hours, general prerequisites must include acceptable courses in quantitative analysis and organic chemistry. Mr. Smith.

A course dealing with that portion of medical knowledge which may be of assistance in serving the needs of law and justice including the effects and detection of poison.

619. Minor Problems in Physiological Chemistry. Two to fifteen credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Physiological Chemistry 614. A student may repeat this course and may spend all or part of his time on it during a Quarter. Mr. Smith, Mr. Brown, Miss Wikoff, Mr. Bosworth.

This course is designed to permit any properly qualified person to avail himself of the facilities of the department for carrying out a minor investigation or for adding to his knowledge and technique in physiological chemistry. A student may exercise complete freedom in his choice of instructor to direct his work in this course.

632. Physiological Chemistry. Five credit hours. Spring Quarter. Three lecture or quiz hours and six laboratory hours each week. Open only to stu-

dents registered in the College of Dentistry. General prerequisites must include general chemistry, qualitative analysis, and organic chemistry. Mr. Brown.

The chemistry of the carbohydrates, lipins, and proteins; together with the chemistry of digestion, absorption, metabolism, and excretion; the tissues; the internal secretions.

633. **Physiological Chemistry.** Two credit hours. Autumn Quarter. One lecture and one quiz hour each week. Open only to students registered in the College of Dentistry. General prerequisites must include Physiological Chemistry 632. Mr. Brown.

The elements of human nutrition; the effects of diets on the human body; the relation of diets to dentistry.

PHARMACOLOGY

671. **Pharmacology.** Four credit hours. Spring Quarter. Three lecture or quiz hours and three laboratory hours each week. Open only to students registered in the College of Medicine. General prerequisites must include Physiology 634, 635, 636 and Physiological Chemistry 602 or 612. Mr. Smith.

This course treats of the modification of the normal physiological processes of the body by the presence of the more common drugs used in medicine.

Not open to students who have credit for Pharmacology 605.

675. **Methods of Biologic Drug Assay.** Two credit hours. Winter Quarter. One lecture and three laboratory hours each week. Given in alternate years. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. Smith.

This course includes consideration of the methods in common use for the biological standardization of drugs.

Not open to students who have credit for Pharmacology 607.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Qualifying Examination for the Master's Degree: At least one Quarter prior to the Convocation at which he expects to receive the Master's degree the candidate must pass a written examination covering general inorganic chemistry, analytical chemistry, and the fundamentals of organic chemistry. He must also give evidence of his ability to read articles in his field written in the German or French language.

*807. **Biochemical Preparations.** Three credit hours. Winter Quarter. One lecture or quiz and six laboratory hours each week. Given in alternate years. General prerequisites must include Physiological Chemistry 612. Mr. Brown.

An advanced course in biochemical preparations, including the isolation of enzymes, lipins, proteins, and such hormones as epinephrin and insulin.

813. **Seminary in Physiological Chemistry.** Two credit hours. Spring Quarter. General prerequisites must include Physiological Chemistry 612. Mr. Smith.

Topic for 1937: The Chemistry of Medicinal Plans.

815. **Biochemical Biography.** One credit hour. Spring Quarter. General prerequisites must include Physiological Chemistry 612. Required of all candidates for graduate degrees in physiological chemistry. Miss Wikoff.

*830. **Chemistry of Medicinal Substances.** Three credit hours. Winter Quarter. Three conference hours each week. Given in alternate years. General prerequisites must include Physiological Chemistry 611, 612, or Chemistry 841 and 842. Mr. Smith.

950. **Research in Physiological Chemistry and Pharmacology.** Autumn, Winter, and Spring Quarters. Research in Physiological Chemistry will be conducted under the guidance of Mr. Smith, Mr. Brown, Miss Wikoff, Mr. Bosworth; research in Materia Medica under the guidance of Mr. Smith and Miss Wikoff.

* Not given in 1936-1937.

PHYSIOLOGY

Office, 209 Hamilton Hall

PROFESSORS HARTMAN, SEYMOUR, AND NICE, ASSOCIATE PROFESSORS EDWIN P. DURRANT (EMERITUS) AND HITCHCOCK, ASSISTANT PROFESSORS HATERIUS THORN, AND R. R. DURANT, MR. ASHCRAFT, MR. DERBYSHIRE, MR. HEGNAUER, MR. ROBINSON, MR. TIPTON, AND ASSISTANTS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Advanced Physiology. Five credit hours. Autumn Quarter. Three lectures and six laboratory hours each week. General prerequisites must include Physiological Chemistry 611 and 612 or equivalent. Physiological Chemistry 611 may be taken concurrently. Department staff.

This course deals with body fluids, cardiovascular system and respiration.

602. Advanced Physiology. Five credit hours. Winter Quarter. Three lectures and six laboratory hours each week. General prerequisites must include Physiology 601 or 615. Department staff.

A study of digestion, metabolism, excretion, reproduction, and endocrine system.

603. Advanced Physiology. Five credit hours. Spring Quarter. Three lectures and six laboratory hours each week. General prerequisites must include Physiology 602 or 616. Department staff.

Neuromuscular systems and sense organs.

604. Advanced Physiology. Seven credit hours. Autumn Quarter. Five lecture or recitation hours and six laboratory hours each week. Open only to students registered in the College of Dentistry. Department staff.

The course deals with the body fluids, cardiovascular system, respiration, digestion, metabolism, nutrition, and excretion.

Not open to students who have credit for Physiology 601 or 615.

605. Advanced Physiology. Seven credit hours. Winter Quarter. Five lecture or recitation hours and six laboratory hours each week. Open only to students registered in the College of Dentistry. Department staff.

A continuation of Physiology 604 dealing with neuromuscular system, endocrines, reproduction, and sense organs.

Not open to students who have credit for Physiology 602 or 616.

618. Physiology of Metabolism. Three to five credit hours. Winter Quarter. Three lecture hours or three lecture and six laboratory hours each week. General prerequisites must include Physiology 601, 602, and 603. Mr. Hitchcock.

This course deals with both the theoretical and practical aspects of human metabolism as measured by determination of the respiratory exchanges. Some of the more important abnormal variations in the metabolic rate are considered. In the laboratory the student is familiarized with some of the simpler types of apparatus for measuring the metabolic rate.

***620. Physiology of Exercise.** Five credit hours. Spring Quarter. Three lectures and six laboratory hours each week. Required of students whose field of specialization is physical education. Intended for students who are not majoring in physiology. Class limited to forty students. Department staff.

This course deals with present conceptions of muscle physiology, the role of the nervous and endocrine systems in the control of muscular activity, the correlation of circulation, respiration and other body mechanisms with the intensity of muscular exercise, in brief, all those physico-chemical processes which make possible and occur as a result of muscular action.

***623. General Physiology.** Five credit hours. Autumn Quarter. Three lecture or quiz and six laboratory hours each week. General prerequisites must include two Quarters of physiology or equivalent biological training, and acceptable courses in organic and physical chemistry.

A study of the physico-chemical principles involved in life processes. The physiological significance of surface tension, diffusion, osmotic pressure, and the colloid state are studied. The fundamental nature of irritability and contractility is considered and a brief comparative

* Not given in 1936-1937.

study is made of the circulatory, respiratory, secretory, and digestive processes in lower and higher organisms.

625. Advanced Mammalian Physiology. Five credit hours. Winter Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include Physiology 601, 602, 603. Department staff.

An advanced course in the physiology of the mammal, based largely on laboratory experiments.

Not open to students who have credit for Physiology 621.

630. Physiology of the Endocrines. Five credit hours. Spring Quarter. Four lectures and three laboratory hours each week. General prerequisites must include Physiology 601, 602, 603, or equivalent. Mr. Hartman, Mr. Curtis, Mr. Durant, Mr. Haterius, Mr. Knouff, Mr. Thorn, Mr. Wiseman.

A study of the functions of the thyroid, parathyroid, thymus, pituitary, adrenal, pancreas, gonads, and other organs with possible endocrine function.

634. Advanced Physiology. Five credit hours. Spring Quarter. Three lectures and six laboratory hours each week. Open only to students registered in the College of Medicine. Department staff.

This course deals with body fluids, cardiovascular system and respiration.

Not open to students who have credit for Physiology 604 or 615.

635. Advanced Physiology. Five credit hours. Autumn Quarter. Three lectures and six laboratory hours each week. Open only to students registered in the College of Medicine. General prerequisites must include Physiology 634. Department staff.

This course includes a study of digestion, metabolism, excretion, reproduction, and endocrine system.

Not open to students who have credit for Physiology 605 or 616.

636. Advanced Physiology. Five credit hours. Winter Quarter. Three lectures and six laboratory hours each week. Open only to students registered in the College of Medicine. General prerequisites must include Physiology 635. Department staff.

A study for the neuromuscular system, central nervous system and sense organs.

Not open to students who have credit for Physiology 606.

700. Minor Problems. Three to fifteen credit hours. Autumn, Winter, and Spring Quarters. Designed for qualified students who wish to begin research. Permission of department chairman required. Department staff.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Prerequisites for graduate students majoring in physiology are the following courses or their equivalents: Chemistry 401, 402, 403, 647, 648, 649, and 650; Zoology 401 and 402; Anatomy 613 and 619; Physiology 601, 602, and 603. Courses in general physics are desirable.

Students who wish to begin work leading to an advanced degree in the department must register as special students in the Graduate School until they pass a qualifying examination which tests their knowledge of the field of physiology. Students wishing to become candidates for the Master's degree must, in addition to the above qualifying examination, pass a comprehensive examination in the general field of physiology not later than the beginning of the Quarter in which they expect to receive the degree. They must also demonstrate a reading knowledge of either French or German.

815-816-817. Seminary in Physiology. Two credit hours. Autumn, Winter, and Spring Quarters. Required of all students majoring in physiology. Department staff.

950. Research in Physiology. Autumn, Winter, and Spring Quarters. General prerequisites must include Physiology 601-602-603 or equivalent courses and the permission of the department chairman.

The department is equipped to supervise research in circulation, endocrinology, and metabolism.

POLITICAL ECONOMY

(See Economics and Sociology)

POLITICAL SCIENCE

Office, 100 University Hall

PROFESSORS SPENCER, ODEGARD, AND WALKER, ASSOCIATE PROFESSOR HELMS, ASSISTANT PROFESSOR AUMANN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

605. Principles of Public Administration I. Five credit hours. Autumn Quarter. Five meetings each week. General prerequisites must include ten hours in political science. Mr. Walker.

A consideration of the general problems of public administration; relations between the administration and the other branches of government—executive, legislative, and judicial; the civil service; personnel administration; budgets and accounting; centralized purchasing.

606. Principles of Public Administration II. Five credit hours. Winter Quarter. Five meetings each week. General prerequisites must include fifteen hours in political science. Mr. Walker.

An examination of the principles of public administration as applied to the rendering of service to the public by national, state and local governments. Attention will be paid to such functions as the protection of life and property, the promotion of trade and commerce, the regulation and operation of public utilities, city and metropolitan planning, and the furtherance of public welfare, noting in each case the part which is played by each of the levels of government.

607. Municipal Government. Five credit hours. One Quarter. Winter and Spring. Five meetings each week. Mr. Helms.

A comparative study of modern municipalities in the United States and the principal countries of Europe; their social significance; their governmental structure; their relation to the state; the experience with government by council, mayor, commission, and manager; methods of popular participation.

†610. Problems of County and Rural Government. Three credit hours. Spring Quarter. Three meetings each week. General prerequisites must include ten hours in political science. Mr. Walker.

A study of structure and functions of county government under both rural and urban conditions and an examination of problems of rural government.

611. Introduction to Jurisprudence. Five credit hours. Autumn Quarter. Five meetings each week. Mr. Spencer.

An introductory study of legal concepts. An attempt is made both to give the prospective law student an analytical and historical guide into his subject, and to give those who do not intend to pursue the study of law an idea of its significance in social organization, and its relation to political and economic science.

612. International Law. Five credit hours. Winter Quarter. Five meetings each week. Mr. Spencer.

A study of the principles of international law in their growth and present status, with particular attention to unsettled points, and problems raised by the World War.

613. Contemporary International Politics. Five credit hours. Autumn Quarter. Five meetings each week. Mr. Helms.

Methods and ideals of diplomacy; current problems in international relations, such as the reorganization of Europe, Pan-Americanism, and the Far East; tendencies toward administrative, judicial, and legislative world-organization.

615. Administration of Justice. Three credit hours. Spring Quarter. Three meetings each week. Mr. Aumann.

A study of the nature, purposes, and limitations of law as administered through courts. The development, organization, and procedure of our judicial system. Recent trends in legal thinking.

† Not given during the academic year, 1936-1937.

616. American Constitutional Law. Three credit hours. Winter Quarter. Three meetings each week. Mr. Aumann.

A study of leading constitutional principles in the United States as interpreted by the courts. Special studies will be made of such topics as the following: the adoption and amendments of constitutions; the judicial power; citizenship; private rights; the powers of Congress; war powers; police power of the states; political privileges. Designed for students who desire a non-technical knowledge of the more important federal and state constitutional principles in the United States.

617. Administrative Law. Three credit hours. Spring Quarter. Three meetings each week. General prerequisites must include Political Science 616. Mr. Odegard.

Administrative organization; procedure of administrative bodies; limits of administrative discretion; quasi-judicial and quasi-legislative powers of administrative bodies; relief against administrative action; conclusiveness of administratve findings. Cases and readings.

621. Ancient and Medieval Political Thought. Three credit hours. Autumn Quarter. Three meetings each week.

The chief theories of European government from the time of Plato to the opening of the modern period. Political Science 621, 622, and 623 are intended to present consecutively the development of European political philosophy.

622. Modern Political Thought. Three credit hours. Winter Quarter. Three meetings each week.

The chief theories of European and American government from the sixteenth century to the middle of the nineteenth century. This course is naturally preceded by Political Science 621, though the latter is not required, and is naturally followed by Political Science 623.

623. Contemporary Political Thought. Three credit hours. Spring Quarter. Three meetings each week.

An examination of the more important contemporary trends of political thought and of the theoretical problems of the nature of the state, of government, and of law.

***626. Dictatorship and Absolutism.** Three credit hours. Autumn Quarter. Three class meetings each week. Alternating with Political Science 611. General prerequisites must include ten hours in political science. Mr. Spencer.

An examination of certain governmental systems of today which are based on rejection of the ideal of democracy. Special attention given to Russia, Italy, and Germany, but consideration also of minor instances. Political and social causes of this contemporary tendency; administrative and constitutional problems.

***631. Methods of Governmental Research.** Three credit hours. Spring Quarter. Three meetings each week. Given in alternate years. General prerequisites must include fifteen hours of political science. Mr. Walker.

The materials of political science; history of procedure in political science research; research technique; presentation of results of research.

633. Legislation. Three credit hours. Spring Quarter. Three meetings each week. Mr. Walker.

The process of law making in the United States, the constituent process, statute law making, legislative drafting, legislative procedure, judicial review, the common law, executive ordinances, popular law making.

634. Public Opinion and Political Processes. Five credit hours. Autumn Quarter. Five meetings each week. Mr. Odegard.

A study of the forces which mould the public mind, and of the channels through which public opinion is expressed, viz., the family, the school, the church, the movies, radio, press, pressure groups and propaganda.

Lectures and discussion.

635. Elections and Parties. Five credit hours. Winter Quarter. Five meetings each week. Mr. Odegard.

A study of voting qualifications, ballot forms, the direct-primary and other forms of nomination, systems of proportional representation, the organization and methods of political parties, and the position and functions of the party system in democracies.

* Not given in 1936-1937.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include a foundation laid in college courses in the historical and social sciences.

HISTORICAL CONFERENCE: In addition to the formal courses indicated below, a monthly conference is held, composed of the instructors and graduate students in the departments of History and Political Science. The discussions in this conference cover a wide range of topics of general interest to students and investigators in these fields.

805. Political Thought. Three to five credit hours. One Quarter. Autumn, Winter, Spring.

Research in the history of political ideas and in the theoretical problems of contemporary politics.

806. Comparative Government. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Spencer.

Research in the governments of foreign countries.

807. Public Opinion and Political Parties. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Odegard.

A systematic study of the informal phases of politics. Special attention will be given to individual projects dealing with pressure groups, political party organization and procedure, and other aspects of the governmental process.

808. Public Administration. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Walker.

Research in staff and line activities of national, state, and local government.

809. Municipal Government. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Helms.

Reading and research in the municipal governments of the United States and Europe.

810. International Relations. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Spencer.

Research in international relations.

811. Public Law. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Aumann.

Readings and research in the field of public law including selected problems in the fields of constitutional law or judicial administration.

814. International Administration. Three to five credit hours. Spring Quarter. Mr. Foster.

A study of the administrative aspects of the process of international cooperation; unions; governing commissions; courts; the sections and technical organizations of the League of Nations; International Labor Organization.

950. Research in Political Science. Autumn, Winter, and Spring Quarters. General prerequisites must include six Quarter-courses in political science.

This course presents an opportunity for advanced research in political science, in such portion of the field as may be agreed upon with the individual student. It is offered in every Quarter, and with any of the members of the department in residence.

POULTRY HUSBANDRY

Poultry Husbandry Building

PROFESSOR DAKAN, ASSOCIATE PROFESSOR WINTER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

603. Marketing and Processing Poultry Products. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include Business Organization 700 or Rural Economics 613. Mr. Dakan.

Processing frozen, dried, and shell eggs. Marketing live and dressed poultry, eggs, and egg products.

606. Poultry Genetics. Five credit hours. Autumn Quarter. Three lecture and two conference periods each week. Given in alternate years. General prerequisites must include courses in chemistry and zoology including a course in heredity. Mr. Dakan.

The principles of genetics applied to the breeding of poultry. A critical review of the literature on poultry genetics and allied subjects.

607. Advanced Poultry Nutrition. Five credit hours. Spring Quarter. Three lectures and two conference periods each week. Given in alternate years. General prerequisites must include courses in chemistry and biological science. Mr. Winter.

A study of experimental methods involved in conducting research in poultry nutrition. A critical review of the literature on poultry nutrition and allied subjects.

701. Special Problems in Poultry Husbandry. Three to fifteen credit hours, taken in units of three to five hours each Quarter for one or more Quarters. Autumn, Winter, Spring. Mr. Dakan, Mr. Winter.

Limited to advanced students and must be arranged with the professor in charge. Each student will be required to make an exhaustive study of some particular phase of poultry husbandry and write a thesis of his study and research. The work must comprise in part some original investigation by the student.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

950. Research in Poultry Husbandry. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the chosen field of research. The student may spend a part or all of his time on research work. Mr. Dakan, Mr. Winter.

Research may be done in genetics, embryology, metabolism, and nutritional diseases.

PRACTICAL ARTS AND VOCATIONAL EDUCATION

(See Education)

PRINCIPLES AND PRACTICE OF EDUCATION

(See Education)

PROSTHESIS

Office, Hamilton Hall

PROFESSOR COTTRELL, ASSISTANT PROFESSORS WILTBERGER AND STARR

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36. These prerequisites include adequate preparation in technical courses concerned.

704-705-706. Minor Problems in Prosthesis. One to three credit hours. Autumn, Winter, and Spring Quarters.

Students will have assigned to them special problems in Prosthesis.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36. These prerequisites include adequate preparation in technical and practical courses in prosthesis.

950. Research in Prosthesis. Autumn, Winter, and Spring Quarters.

Research relating to and found in the various endeavors concerning the restoration of the mouth to normal conditions through substitutions for lost parts.

PSYCHOLOGY

Office, 325 Education Building

PROFESSORS ARPS, BURTT, GODDARD, MAXFIELD, PRESSEY, TOOPS, DOCKERAY, RENSHAW, ENGLISH, WILLIAMS, AND BERRY, ASSOCIATE PROFESSORS VALENTINE AND ROGERS, ASSISTANT PROFESSORS DUREA, EDGERTON, HAVEN, AND STOGDILL, DEAN GAW

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

The department offers instructional and training facilities in practically all divisions of psychology. For administrative purposes and for the general guidance of the student, these have been grouped into a number of areas but there is great flexibility in the working out of a unified program of study. For this last the student is urged at once upon entering on graduate study (or even before when this is possible) to consult with a member of the staff. Not later than the second Quarter of graduate study the student should request the appointment of a major adviser and an advisory committee.

The general comprehensive examination required by the Graduate School of candidates for the doctorate covers all the areas of the department in a general way but permits of some specialization in the fields of the student's chief interest.

The areas of the department are as follows:

1. General theoretical, experimental, and comparative Psychology.
2. Educational Psychology (including mental and educational tests; this area also administers a service course of remedial work with students on probation).
3. Clinical and Abnormal Psychology. In addition to class instruction, this area maintains a service clinic for the examination of children, and a consultation service for students in the University. Men should make appointment with Mr. Durea, women with Mrs. Emily Stogdill.
4. Statistics of Psychology and College Personnel. (This area also administers the University Intelligence Tests).
5. Industrial and Business Psychology.

601. Experimental Psychology. Three credit hours. Autumn Quarter. One lecture and two laboratory periods each week. Mr. Renshaw.

The laboratory training course in experimental psychology for advanced undergraduate and graduate students. The experiments are selected both for general cultural value and for preparation for technical research in experimental psychology.

Courses 601, 602, 603 comprise a unit year's work. Students may enter any Quarter.

602. Experimental Psychology. Three credit hours. Winter Quarter. One lecture and two laboratory periods each week. Mr. Renshaw.

603. Experimental Psychology. Three credit hours. Spring Quarter. One lecture and two laboratory periods each week. Mr. Renshaw.

605. Physiological Psychology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Goddard.

The aim of this course is to give a consistent picture of the physical basis of mind. It uses the important facts of the anatomy and physiology of the central and automatic nervous systems and the more generally accepted theories of nerve functions and their correlations with mental processes.

606. Advanced Physiological Psychology. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include Psychology 605 or permission of the instructor must be obtained. Mr. Goddard.

This course will deal with the larger problems of the dependence of mental phenomena upon physiological processes such as: the emotions and the sympathetic system; temperament and the endocrines; consciousness and the circulation; nerve activity without consciousness; effect of unusual physiological conditions (e.g., produced by fatigue, alcohol, syphilis or other toxins) upon various mental processes.

607. Genetic Psychology. Five credit hours. Spring Quarter. Five lecture hours each week. Lectures, recitations, and reports. Mr. Williams.

This course is designed to present the facts of mental development and their significance. Topics considered are: individual development, particularly with reference to the development of the nervous system; inheritance of mental traits; innate tendencies, their characteristics, descrip-

tion, and modification; play; mental states, their physiological basis and development with growth and training; moral and religious development; physical development.

608. Educational Statistics: Elementary. Four credit hours. Autumn Quarter. Two lectures and two two-hour laboratory periods each week. Mr. Toops, Mr. Edgerton.

A basic statistical course for students intending to conduct major or minor research. Frequency distributions, measures of central tendency and variability; construction of graphs and charts; interpretation of results in terms of probability; simple treatment of correlation. Extended practice in the use of calculating machines and computational devices.

609. The Exceptional Child. Three credit hours. One Quarter. Winter and Spring. Three lecture hours each week. Lectures, reports, clinics, and visits to public institutions. General prerequisites must include fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects or sociology. Mr. Maxfield, Mr. Berry.

Individual differences among children with respect to mental, physical, and social traits. The social and pedagogical significance of talent and defect. Consideration of gifted children, special abilities and disabilities, blindness, deafness, speech defect, mental retardation, and behavior problems. Emphasis will be placed on the psychology of the exceptional child as a foundation for educational classification and treatment.

610. Adolescence. Three credit hours. Autumn Quarter. Three lectures each week. Mr. English.

A study of the outstanding characteristics of the adolescent boy and girl, the educational and social problems arising at this period, and means for dealing with these problems.

611. The Mentally Deficient Child. Three credit hours. Autumn Quarter. Three lecture hours each week. Lectures, reports, clinics, and visits to public institutions. General prerequisites must include fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects or sociology. Mr. Maxfield.

The varieties and grades of mental deficiency, including the backward child of the schools and the distinctly feeble-minded. Consideration of mental deficiency and defect for purposes of educational treatment and social disposition. The psychology of feeble-mindedness; types, degrees, causes, and consequences.

613. Mental and Educational Tests. Three credit hours. Winter Quarter. Two lectures and one conference and laboratory hour each week. Lectures, readings, classroom demonstrations, and special reports. Mr. Pressey.

A broad basic course for teachers and students of psychology, clinical work, and sociology. The course will begin with a discussion of tests in school subjects, will then take up tests of general and special ability and "non-intellectual" traits, and will conclude with a general discussion of the construction of tests and their use in dealing with various practical and research problems.

615. Laboratory in Tests and Educational Diagnosis. Three credit hours. Spring Quarter. Six laboratory hours each week. General prerequisites must include Psychology 613 or permission of the instructor must be obtained. Mr. Pressey.

Practice in the giving and scoring of tests and in the use of tests in dealing with educational problems. Special attention will be given to use of test materials in the diagnosis of special disabilities and difficulties in school work.

616. Individual Testing by the Binet-Simon Method. Two credit hours. One Quarter. Autumn and Winter. Two laboratory periods each week. Reports, laboratory demonstrations, and individual testing. General prerequisites must include fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects or sociology. Mr. Maxfield, Mr. Durea.

Practice on the technique of the Stanford revision of the Binet-Simon scale for measuring intelligence. Brief historical and descriptive treatment of the Binet scale, followed by intensive training in its practical use.

617. Advanced Binet Testing. Two credit hours. One Quarter. Winter and Spring. Two laboratory periods each week. Reports, laboratory demonstra-

tions, and individual testing. Psychology 616 must be included in the general prerequisites or taken concurrently. Mr. Maxfield, Mr. Durea.

Advanced study and application of the Binet-Simon method. Review of revisions of the Binet-Simon scale. Intensive training in the practical use of the revisions by Kuhlmann, Herring, and Hayes.

618. **Clinical Tests.** Two credit hours. One Quarter. Autumn and Spring. Two laboratory periods each week. Laboratory demonstrations and individual testing. General prerequisites must include fifteen hours of psychology. Mr. Maxfield, Mr. Durea.

Descriptive and practical laboratory study of standard diagnostic tests and techniques, particularly those known as performance tests.

619. **Psychological Clinic.** Two or four credit hours. One Quarter. Autumn, Winter, Spring. One four-hour laboratory period each week. Clinic practicum. Individual case studies, reports, case conferences, home visits, and clinical procedure. May be taken for one or two Quarters with a maximum credit of four hours. General prerequisites must include Psychology 616 and 618; Psychology 617 must be included in the prerequisites, or permission of the instructor must be obtained. Mr. Goddard, Mr. Maxfield.

Theory and practice of clinical case study, including family history, personal history, school history, and social history. Interpretation of reports of medical examiners, teachers, social agencies, etc., as well as interpretation of test results. Participation in the regular work of the Psychological Clinic conducted by the Department of Psychology. Training in the preparation of clinical reports.

NOTE: A student may profitably receive the special training which this course gives for a Quarter. Repetition does not involve repetition of content but additional practice in clinical procedure.

620. **Advanced Psychological Clinic.** Two credit hours. One Quarter. Autumn, Winter, Spring. Assignments equivalent to two laboratory periods each week. General prerequisites must include Psychology 619 or permission of the instructor must be obtained. (Students are advised to consult instructor before registering.) May be taken for one or two Quarters with a maximum credit of four hours. Mr. Goddard, Mr. Maxfield, Mrs. Stogdill.

Students will engage in actual clinical service, under the supervision of the instructor. Cases will be studied in the Psychological Clinic and in the nearby public schools and institutions. Special training in the diagnosis of borderline, psychopathic and doubtful cases. Case studies involving psycho-educational or behavior problems. Follow-up work on cases previously studied in the clinic. Problems of educational and vocational guidance. Advanced training in the preparation of clinical reports. Students expecting to deal with problems of college personnel will be assigned to work in this field.

NOTE: A student may profitably receive the special training which this course gives for a second Quarter. Repetition does not involve repetition of content but additional practice in clinical procedure.

621. **Social Psychology.** Three credit hours. Winter Quarter. Three lecture hours each week. Mr. Arps.

The nature and variety of innate tendencies; the relation of these tendencies to acquired behavior and social control; the development of personality.

622. **The Psychology of the Delinquent Child.** Three credit hours. Spring Quarter. Three lecture hours each week. Lectures, reports, and visits to the Bureau of Juvenile Research. General prerequisites must include ten hours of psychology or permission of the instructor must be obtained. Mr. Maxfield.

The meaning and significance of delinquency; its psychological basis; causes and prevention; the home and school as factors determining delinquent behavior; the significance of psychological findings for juvenile court procedure; present day methods of dealing with the problem.

624. **Psychology of Vision and Hearing.** Five credit hours. Spring Quarter. Five lectures each week. Given in alternate years. General prerequisites must include Psychology 602. Mr. Williams.

Production, measurement and control of photic stimuli and measurements of the variations in their effectiveness as determined by physical and physiological factors. The work will consist in part of lecture-demonstrations and experiments and in part of a critical study of the reports of original authors. Special attention will be given to the facts and hypotheses of color-vision and to visual problems in industry.

626. Problems in Learning and Thinking. Three credit hours. Winter Quarter. Three lecture and discussion hours each week. Mr. Renshaw.

The development of the principles which underlie the acquired modifications of human behavior.

***628. Principles and Economy of Learning.** Three credit hours. Winter Quarter. Three lectures each week. Lectures, readings in monographs and journals, discussions. Mr. English.

An advanced course in educational psychology, dealing with certain especially important problems in the field, such as the control of the learning process, memory and forgetting, transfer of training, generalization and thinking in relation to memory and the more elaborate types of learning such as are seen in school work. Special attention will be paid to recent experimentation and theories.

629. Advanced Psychology. Five credit hours. Autumn Quarter. Five lectures each week. Miss Rogers.

The purpose of this course is to give a larger background to the advanced student of psychology, with respect to other disciplines, especially the sciences, leading to a systematic development of the more complex experiences.

630. Psychology of Feeling and Emotion. Five credit hours. Spring Quarter. Five lectures each week. Miss Rogers.

A study of the various theories of feeling and emotion and the fundamental relations of emotion to instinct. Emotions in relation to various physiological activities. Methods of investigating emotion.

***631. Psychological Theories of Ability.** Three credit hours. Spring Quarter. Three lecture hours each week. This course alternates with Psychology 676. Mr. English.

Critical consideration of naive ideas about ability; faculty psychology. Influence of Darwinism on conceptions of intelligence. Early mental testing. Binet and his successors. Test results and theories of intelligence. Problems of special abilities and of mental types. Relation of measurement of ability to systematic psychology.

634. Criminal and Legal Psychology. Five credit hours. Winter Quarter. Five lectures each week. Mr. Burtt.

Psychological factors in the determination of reliability of testimony; the technique of detecting crime and falsehood; responsibility; the relation of crime to mental disease or defect; the prevention of crime through environmental factors and heredity.

635. Psychology of Advertising. Three credit hours. One Quarter. Autumn and Spring. Three lectures each week. Mr. Burtt.

The psychological principles involved in effective advertising, notably attention, memory and action, with the contributory factors of association, feeling, instinct, suggestion, and reasoning.

637. Industrial Psychology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Burtt.

The application of psychology to problems of industrial learning, adjustment of technical to mental factors, monotony, fatigue, environmental conditions, industrial unrest, morale, and accidents.

638. Industrial and Vocational Psychology Laboratory. Three credit hours. Spring Quarter. Two three-hour laboratory periods each week. In addition to the general prerequisites the permission of the instructor must be obtained. Mr. Burtt.

Laboratory work in the application of psychology to industrial and vocational problems, with especial emphasis on the development of psychological techniques for hiring employees. Practice in the devising and standardizing of occupational tests; obtaining and evaluating production ratings; correlation of ratings and tests; interpretations of results from the standpoint of vocational selection or guidance. A portion of the work of the course is frequently done in local business and industrial plants.

639. Psychology and Personnel. Three credit hours. Winter Quarter. Three lectures each week. Mr. Burtt.

The application of psychology to problems of personnel. Selection and placement of employees by tests of intelligence and special ability. Trade tests, job analysis, and rating scales.

640. Educational and Vocational Guidance. Three credit hours. Winter Quarter. Mr. Edgerton.

A course dealing with the technique of evaluating psychological and related factors as a basis for making educational and vocational recommendations to individuals. The place of voca-

* Not given in 1936-1937.

tional and educational tests, previous record, and personality traits in determination of choice of occupation or course of study.

641. Abnormal Psychology. Five credit hours. Winter Quarter. Five lectures each week. Lectures and reports. Mr. Goddard.

The abnormal mental phenomena—viz., disorders of perception, association, memory, affection, judgment, action, volition, and personality, with especial emphasis on their relation to the respective normal phenomena. The grouping of these disorders into the syndromes exhibited in the main types of insanity.

***642. Psychopathology.** Three credit hours. Spring Quarter. Three lectures each week. Lectures and reports. Mr. Goddard.

This course deals with the unusual (so-called pathological) manifestations of mind. Beginning with a consideration of subconscious phenomena—sleep, dreams, hypnosis, automatic writing, etc., there will be discussed: phobias, suggestion, the psychological aspects of hysteria, and multiple personality, psychasthenia, neurasthenia, and other disorders of personality.

644. Human Motives and Incentives. Three credit hours. Spring Quarter. Three hours each week. Lectures, recitations, and assigned readings. Mr. Toops.

The psychological bases of initiation and improvement of work. The role of instinct, habit, custom, and tradition, rationalization and psychopathy in motivation. The incentive values of self-ratings, competition, punishment, and such rewards as money, bonuses, participation, and promotion, in relation to the capacities of individuals.

645. History of Psychology. Five credit hours. Autumn Quarter. Five lectures each week. General prerequisites must include sixteen hours in psychology. Mr. Williams.

The course aims to view modern psychological problems in the light of their historical antecedents. The development of various theories such as those of sensation, attention, space perception, and emotion will be traced from earliest times to the present. As far as possible assignments will involve reference to original sources.

646. Principles of Human Behavior. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include sixteen hours in psychology. Mr. Dockeray.

A study of the development of theories of human behavior and a consideration of the simplest assumptions necessary and sufficient to explain the facts of human behavior as dependent on social and biological conditions.

647. Theoretical Psychology. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include sixteen hours in psychology. Mr. Dockeray.

Lectures and assigned readings bearing on the evolution of psychological theory in its relation to the physical and the social sciences.

650. Minor Problems. One or more credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include sixteen hours in psychology and the permission of the instructor must be obtained. All instructors.

Investigation of minor problems in the various fields of psychology.

By permission of the Chairman of the Department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

652. Psychology of High School Subjects. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include a course in educational psychology. Mr. Pressey.

An analysis of the specific psychological processes involved in algebra, language, science, and other high school subjects, with consideration of the conditions which promote learning in each subject, and examination of textbooks and methods from this point of view.

655. Comparative Psychology. Five credit hours. Autumn Quarter. Five lectures each week. Mr. Williams.

The principles of animal behavior in relation to human behavior. A study of the similarities and differences in the behavior of animals and of humans and the explanation of these similarities and differences, with special reference to those principles definitely involved in the organism's instinctive and acquired mode of adjusting to its environment.

* Not given in 1936-1937.

656. Comparative Psychology. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Psychology 655. Mr. Williams.

A continuation of Psychology 655. Devoted largely to contemporary literature in Comparative Psychology.

657. Comparative Psychology Laboratory. Three credit hours. Autumn Quarter. One lecture each week and laboratory periods to be arranged. Mr. Williams.

The methods and results of investigation of animal behavior in relation to human behavior.

659. University Personnel Psychology. Three credit hours. Autumn Quarter. Two lectures and one two-hour laboratory period each week. Given in alternate years. Mr. Toops.

A course designed for students who are preparing for positions in vocational guidance or personnel work in universities and those interested in the achievement of adults. The giving, scoring and interpretation of tests of university entrants. Reading tests and tests of special capacities of adults. Planning a testing program for adults. Theories of adult testing. Comparative study of University personnel programs and procedures. The content of the course will vary somewhat from year to year.

***660. Comparative Psychology Laboratory.** Three credit hours. Spring Quarter. One lecture each week and laboratory periods to be arranged. General prerequisites must include Psychology 657. Mr. Williams.

A continuation of Psychology 657.

662. The Pre-School Child. Three credit hours. Winter Quarter. Two lectures and one conference hour each week. Mr. Dockeray.

This course will present the elements of child nature, individual differences and fundamental appetites. The process of socialization will be considered in terms of the variety of situational settings impinging on the child. All of the content of the course will be concerned with the significance of early behavior patterns.

663. Psychology of the Elementary School Period. Five credit hours. Autumn Quarter. Four class meetings a week and one hour or more of observations or laboratory work. Required of students specializing in elementary education. Mr. English, Mr. Pressey.

The psychological development of the child from five to twelve years. Effects of the school and out-of-school activities on development. Analysis of significant psychological problems involved in curricular activities. Provision by school and other social agencies for the psychological needs of the child.

674. Research Problems of the Dean of Women. One or more credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Survey 665 or its equivalent, and the approval of the instructor must be obtained. Mrs. Gaw.

Investigation of the minor psychological problems which arise in connection with the social, scholastic, and vocational adjustments of undergraduate women.

676. Methods and Viewpoints in Educational Psychology. Three credit hours. Winter Quarter. Three lectures each week. This course alternates with Psychology 631.

A critical appraisal of the implications for education of modern psychological movements from Preyer and G. S. Hall to the present day.

***677. Graphic Methods.** Two credit hours. Spring Quarter. Two lectures each week. Given in alternate years. Mr. Toops.

Graphic presentation of the results of experiments and investigations; histograms, bar charts, specialized charts; tri-dimensional presentation.

678. Psychology of Personality. Three credit hours. Spring Quarter. Three lectures each week. Mr. Durea.

This course will consider the individual both as a social and biological unit, relating each group of factors to the development of personality. Ample attention will be given to questions such as integration, measurement of traits, personality types, faulty schemes of character analysis; effect of glands of internal secretion; self-analysis. The course is correlative to Psychology 641.

* Not given in 1936-1937.

680. Educational Tests and Measurements. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings and reports. Open to seniors and graduate students of experience with permission of the instructor in charge. Mr. Heck, Mr. Pressey.

A service course for those majoring in Elementary and Secondary Education and School Administration. The course will consider selection of tests and organization of testing programs for elementary and secondary schools; the use of tests in classification, diagnosis, prognosis, and educational guidance; the principles of teacher-made tests; and effect of testing on market systems.

Not open to students who have credit for School Administration 624 or 625.

For Course in Principles of Psychology for Advisers, see Survey 665 on page 195.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include the equivalent of at least two years of psychology; or of one year of psychology and one year of college work in one of the following subjects: philosophy, mathematics, physiology, physics, zoology, sociology.

802. Seminary in Experimental Psychology. Two credit hours. Autumn, Winter, and Spring Quarters. Mr. Renshaw, Mr. Dockeray, Miss Rogers.

803. Seminary in Educational Psychology. Two credit hours. Winter Quarter. Mr. English.

***804. Seminary in Tests and Measurements.** Two credit hours. Spring Quarter. Mr. Pressey.

805. Contemporary Psychological Literature. One credit hour. Autumn, Winter, and Spring Quarters. Mr. Renshaw.

806. Seminary in Abnormal Psychology. Two credit hours. Winter and Spring Quarters. Mr. Maxfield, Mrs. Stogdill.

807. Seminary in Industrial Psychology. Two credit hours. Winter Quarter.

808. Psycho-Analysis. Two credit hours. Autumn Quarter. Two lectures each week. Mr. Goddard.

This course will deal with the history and development of psycho-analysis; the theories of Freud, Jung, and others. Special emphasis will be placed on those concepts that are of value to teachers in their effort to appreciate the individual differences in students. The significance of the unconscious and the various methods of tapping the unconscious.

***810. Psychological Problems in Higher Education.** Two credit hours. Autumn Quarter. One meeting each week. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. Pressey.

A critical review of the research work thus far done on such problems as study methods, background information essential for college work, individual differences, placement tests, measurement of progress. The course is intended to give graduate students preparing for college or university positions contact with current educational research regarding the problems they will meet, and develop a research attitude toward these problems.

811. Advanced Theoretical Psychology. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include Psychology 647. Mr. Dockeray.

814. Advanced Statistics. Three credit hours. Winter Quarter. Two lectures and one two-hour laboratory period each week. The general prerequisites must include a course in educational statistics and a course in college algebra. Mr. Toops.

Special cases in correlation; non-linear regression; construction of criteria; sampling; statistical machines; derivation of commonly used equations; critical readings; construction of tables and graphs to meet the research needs of individual students.

Not open to students who have credit for Psychology 654.

* Not given in 1936-1937.

815. Seminary in Psychological Statistics. Two credit hours in each of two successive Quarters. Autumn and Winter Quarters. One two-hour discussion period each week. Mr. Toops, Mr. Edgerton.

Statistical background equivalent to the sequence Psychology 608, 814 is assumed. Critical discussion of problems in the forefront of statistical psychology.

825. Psychological Problems of Adult Life. Two credit hours. Autumn Quarter. Mr. Pressey, Mr. English.

A survey of the important recent psychological literature on changes in capacity for learning through the adult years and into old age, changes in incentives and interests throughout these years, emotional development and orientation of adults with special reference to problems of the teacher, of adult and parent education, of unemployment and vocational readjustment, and use of leisure.

950. Research in Psychology. Autumn, Winter, and Spring Quarters. All instructors.

Primarily intended for students offering theses for advanced degrees.

By permission of the Chairman of the Department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

RHETORIC AND ENGLISH LANGUAGE

(See English)

ROMANCE LANGUAGES AND LITERATURES

Office, 111 Derby Hall

PROFESSORS HENDRIX, MOORE, HAVENS, ROCKWOOD, ANIBAL, AND DEMOREST, ASSOCIATE PROFESSOR SCHUTZ, ASSISTANT PROFESSORS HAMILTON, GUTIERREZ, AND FOURE, MRS. FOURE

GRADUATE ROMANCE CLUB

The Graduate Romance Club fosters an interest in advanced work in the Romance Languages and Literatures. Its meetings, held monthly, consist of reports by graduate students or faculty members on their own investigations as well as on books and articles bearing on the field.

The problems of graduate students and themes suggested by faculty members will be discussed. Regular attendance of graduate students in the department is strongly urged.

FRENCH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

600. French Literature of the Seventeenth Century, 1680-1715. Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. Lectures, collateral reading, and reports. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

The close of the seventeenth century. The Quarrel of the Ancients and the Moderns. Selected works of LaFontaine, LaBruyère, Fénelon, Bossuet, and Fontenelle will be read.

601. French Literature of the Seventeenth Century, 1600-1660. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Lectures, collateral reading, and reports. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

The pre-Classic period: formation of the school of 1660. The Libertines, growth of French comedy and tragedy, The Précieuses, The French Academy will be discussed. Selected works of Malherbe, De Viau, Descartes, Balzac, and Corneille will be read.

602. French Literature of the Seventeenth Century, 1660-1680. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Lectures, collateral reading, and reports. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

The school of 1660. Selected works of Pascal, Molière, Boileau, Racine, La Rochefoucauld, Mme. de Sévigné, and Mme. de Lafayette will be read.

603. French Literature of the First Half of the Nineteenth Century. Five credit hours. Spring Quarter. Five recitations each week. Lectures, collateral reading and reports. General prerequisites must include two introductory courses in French literature. Mr. Havens.

French literature from 1800 to 1850. The development of romanticism in the novel, poetry, and the theatre.

605. French Literature of the Fifteenth and Sixteenth Centuries. Three credit hours. Autumn Quarter. Three lectures each week. Given biennially. General prerequisites must include two introductory courses in French literature. Mr. Moore.

Villon, Rabelais and contemporaries.

606. French Literature of the Sixteenth Century. Three credit hours. Winter Quarter. Three recitations each week. Given biennially. General prerequisites must include two introductory courses in French literature. Mr. Moore.

Montaigne; the Pléiade.

607. French Literature of the Eighteenth Century, 1700-1750. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include two introductory courses in French literature. Mr. Havens.

Rapid reading, with lectures and reports. Fontenelle, Bayle, Crébillon, Voltaire, Montesquieu, Marivaux, and others.

608. French Literature of the Eighteenth Century, 1750-1789. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include two introductory courses in French literature. Mr. Havens.

Rapid reading, with lectures and reports. Voltaire, Rousseau, Diderot, Beaumarchais, and others.

***609. The French Novel to 1850.** Three credit hours. Autumn Quarter. Three lectures each week. Given biennially, alternating with French 611-612. General prerequisites must include two introductory courses in French literature. Mr. Demorest.

Rapid survey of the French novel during the sixteenth, seventeenth, and eighteenth centuries and the first half of the nineteenth century. Mme. de Staël, Chateaubriand, George Sand, Hugo, and Balzac. Lectures, reports, and collateral reading.

***610. The French Novel, 1850 to the Present Day.** Three credit hours. Winter Quarter. Three lectures each week. Given biennially, alternating with French 611-612. General prerequisites must include two introductory courses in French literature. Mr. Havens.

Flaubert, Maupassant, Zola, Daudet, France, Bazin, Loti, and others. Lectures, reports, and collateral reading.

611. The Comedy of Manners in the Nineteenth Century, 1800-1880. Three credit hours. Autumn Quarter. Three lectures each week. Given in alternate years. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

La Pièce Bien Faite, La Pièce à Thèse, Picard, Scribe, Dumas fils, Augier, Sardou. Rapid readings with lectures and reports.

612. The Comedy of Manners of the Nineteenth Century, 1880-1914. Three credit hours. Winter Quarter. Three lectures each week. Given biennially, alternating with French 609-610. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

Le Theatre Libre, Becque, Curel, Hervieu, Lavedan, Donnay, Bernstein, Bataille, Guitry. Rapid reading with lectures and reports.

* Not given in 1936-1937.

623. Cours de Style. Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. General prerequisites must include a "600" course in French literature, and permission of the instructor must be obtained. This course is conducted in French. It is limited to twenty students. Mr. Fouré.

624. Cours de Style (Continued). Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include French 623, and permission of the instructor must be obtained. This course is conducted in French. It is limited to twenty students. Mr. Fouré.

†627. French Phonetics. Three credit hours. Three meetings each week with laboratory practice. General prerequisites must include six Quarters of collegiate French or the equivalent, with a grade not less than "C" and permission of the instructor must be obtained. This class is limited to twelve.

The formation of French sounds. Lectures, with exercises in the use of the symbols of the International Phonetic Association. A systematic study of the rules of French pronunciation. Careful drill in the reading of French. Designed for advanced students who expect to teach French.

Not open to students who have credit for French 632.

628. Modern French Syntax. Three credit hours. Spring Quarter. General prerequisites must include six Quarters of collegiate French or the equivalent, with a grade of not less than "C." Mr. Schutz.

A careful study of French grammar, with composition to illustrate. Designed for advanced students who expect to teach French.

629. History of the French Language. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include at least one "600" course in literature and some acquaintance with elementary Latin. Mr. Schutz.

A rapid survey of the development of the French language, with special reference to the social and cultural conditions involved.

632. French Phonetics and Diction. Five credit hours. One Quarter. Autumn and Winter. Five meetings each week with laboratory practice. General prerequisites must include six Quarters of collegiate French or the equivalent, with a grade not less than "C" and permission of the instructor must be obtained. The class is limited to twelve. Mrs. Fouré, Mr. Rockwood.

The formation of French sounds. Lectures, with exercises in the use of the symbols of the International Phonetic Association. A systematic study of the rules of French pronunciation and diction. Careful drill in the reading of French. Designed for advanced students who expect to teach French.

Not open to students who have credit for French 627.

***640. France in Twentieth Century Literature.** Three credit hours. Spring Quarter. Lectures, collateral readings, and reports. General prerequisites must include two introductory courses in French literature. Mr. Demorest.

Developments in the novel, essay and poetry since 1900, and their relationships with French life. Estaunié, Roland, Proust, Gide, Barbusse, Duhamel, Maurois, Romains, Morand, Benoit, Colette, Claudel, Valery, and others. Regionalism, etc.

701. Minor Problems in French. Three to five credit hours. Autumn, Winter, and Spring Quarters. Professors and Associate Professors.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 692.

* Not given in 1936-1937.
† Not given during the academic year, 1936-1937.

ITALIAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

***601. Modern Italian Literature, 1800-1850.** Five credit hours. Winter Quarter. Five recitations each week. Mr. Moore.

Foscolo, Manzoni, Pellico, Leopardi.

***602. Modern Italian Literature, 1851-1900.** Five credit hours. Spring Quarter. Five recitations each week. Given in alternate years. Mr. Moore.

Rovetta, Carducci, Giacosa, Fogazzaro.

611. Dante's Life and Works. Three credit hours. Winter Quarter. Three lectures each week. Given in alternate years. General prerequisites must include Italian 602 or the permission of the instructor must be obtained. Mr. Moore.

Reading of the Vita Nuova and The Inferno, Cantos 1-16.

701. Minor Problems in Italian. Three to five credit hours. One Quarter. Autumn and Winter. Prerequisite, junior standing and the approval of the department. Mr. Moore.

SPANISH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

605. Advanced Composition and Conversation. Three credit hours. Autumn Quarter. Three recitations each week. Given in alternate years. General prerequisites must include a course in Spanish composition and a "600" course in Spanish literature. Mr. Gutierrez.

This course, conducted wholly in Spanish, is designed especially for prospective teachers and for persons desiring a practical command of the language. The subject matter will be for the most part in history, customs, and manners of Spain.

606. Advanced Composition and Conversation (Continued). Three credit hours. Winter Quarter. Three recitations each week. Given in alternate years. General prerequisites must include Spanish 605. Mr. Gutierrez.

This course, conducted wholly in Spanish, is designed especially for prospective teachers and for persons desiring a practical command of the language. The subject matter will be for the most part in history, customs, and manners of Spain.

***607. The Modern Spanish Novel.** Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 609-610. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A careful study of the development of the modern Spanish novel, reading of representative authors. Lectures, collateral reading, and reports.

***608. The Modern Spanish Novel (Continued).** Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 609-610. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A careful study of the development of the modern Spanish novel, reading of representative authors. Lectures, collateral reading, and reports.

609. Romantic Drama and Poetry of the Nineteenth Century. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 607-608. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A survey of the movements in Spanish drama and poetry during the first half of the nineteenth century. Lectures, collateral reading, and reports.

* Not given in 1936-1937.

610. Modern Spanish Drama. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 607-608. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A survey of the movements in Spanish drama and poetry during the second half of the nineteenth century. Lectures, collateral reading, and reports.

***611. Drama of the Golden Age.** Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Given in alternate years. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

An intensive study of a limited number of plays of the representative dramatists. Lectures, collateral reading, discussion, and reports.

***614. Cervantes.** Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Given in alternate years. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

A study of the works of Cervantes, with especial emphasis on the Quixote. Lectures, collateral reading, discussion, and reports.

615. Survey of Spanish Literature from the Earliest Times to the Seventeenth Century. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Given in alternate years. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

Lectures, collateral reading, discussion and reports.

616. Survey of Spanish Literature of the Seventeenth and Eighteenth Centuries. Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. Given in alternate years. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

Lectures, collateral reading, discussion, and reports.

617. Modern Spanish Syntax. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

Study of syntax, designed for advanced students who expect to teach Spanish.

620. Spanish Phonetics. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include two introductory courses in Spanish literature.

Careful and detailed study of special problems involved in teaching Spanish to English-speaking students. Laboratory analysis of differences between English and Spanish pronunciation. Not open to students who have credit for Phonetics 605.

***626. The Spanish Drama of the Sixteenth Century.** Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 630. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

***630. Survey of Spanish-American Literature.** Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 626. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A study of the masterpieces of Spanish-American literature. Lectures, collateral reading, discussion, and reports.

†**640. Spain in Twentieth Century Literature.** Three credit hours. Lectures, collateral readings, and reports. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

The Generation of 1898, including essayists and others who contributed to the Revolution of 1931.

* Not given in 1936-1937.
† Not given during the academic year, 1936-1937.

†641. **Spain in Twentieth Century Literature (Continued).** Three credit hours. Lectures, collateral readings, and reports. General prerequisites must include two introductory courses in Spanish literature.

The Generation of 1898, including essayists and others who contributed to the Revolution of 1931.

701. **Minor Problems in Spanish.** Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Anibal, Mr. Hendrix.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 692.

ROMANCE LANGUAGES

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Students intending to major in Romance Languages are urged to elect the following courses outside the department: History of France (History 624, 625), Introduction to the Study of the History of Language (Greek 701), the History of Philosophy (Philosophy 601-602-603), the History of Critical Theory (English 605), Vulgar Latin (Latin 627). No student will be considered as a candidate for the M.A. degree unless his program includes at least two courses exclusively for graduates.

French 801 and 802 are required of candidates for the Master's degree in French.

Spanish 805 and 806 are required of candidates for the Master's degree in Spanish.

FRENCH

801. **Introduction to Old French.** Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include three years of collegiate French. Some knowledge of Latin is desirable. Mr. Schutz.

Elements of Old French phonology and morphology. Intensive readings in representative texts.

802. **Introduction to Old French (Continued).** Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include French 801. Mr. Schutz.

*803. **Old Provencal.** Three credit hours. Winter Quarter. General prerequisites must include French 802. Mr. Schutz.

Study of the language and literature of the Troubadours; Appel's Provenzalische Chrestomathie (Leipzig, 6th edition).

*804. **Old Provencal (Continued).** Three credit hours. Spring Quarter. General prerequisites must include French 803. Mr. Schutz.

Study of the language and literature of the Troubadours; Appel's Provenzalische Chrestomathie (Leipzig, 6th edition).

811. **Seminary in French Literature.** Three credit hours. Autumn Quarter. General prerequisites must include three years of collegiate French and permission of the instructor must be obtained. Mr. Havens.

Topic: Jean Jacques Rousseau.

812. **Seminary in French Literature (Continued).** Three credit hours. Winter Quarter. General prerequisites must include three years of collegiate French and permission of the instructor must be obtained. Mr. Demorest.

Topic: Studies in the Modern Regionalistic Novel.

813. **Old French Literature.** Three credit hours. Spring Quarter. General prerequisites must include French 801 or the equivalent. Mr. Schutz.

Rapid reading of Aucassin et Nicolette, selected works of Marie de France and Chrétien de Troyes. Reports on outside reading. Lectures on the main aspects of Old French Literature

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

817. Seminary in French Literature. Three credit hours. Spring Quarter. General prerequisites must include three years of collegiate French and the permission of the instructor must be obtained. Mr. Rockwood.

Topic: Molière.

950. Research in French Language or Literature. Autumn, Winter, and Spring Quarters. General prerequisites must include not less than four years of collegiate French and permission of the instructor in charge must be obtained. Mr. Moore, Mr. Havens, Mr. Rockwood, Mr. Schutz, Mr. Demorest.

This course is designed to meet the needs of individual graduate students who are pursuing a major study in the Department of Romance Languages.

ITALIAN

950. Research in Italian Language or Literature. Autumn and Winter Quarters. Mr. Moore.

This course is designed to meet the needs of individual graduate students who are pursuing a major study in the Department of Romance Languages.

SPANISH

805. Old Spanish. Three credit hours. Autumn Quarter. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor in charge must be obtained. Mr. Hendrix.

806. Old Spanish (Continued). Three credit hours. Winter Quarter. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor in charge must be obtained. Mr. Hendrix.

815. Seminary in Spanish Literature. Three credit hours. Autumn, Winter, and Spring Quarters. Lectures, readings, and reports. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor in charge must be obtained. Mr. Hendrix, Mr. Anibal.

***821. Old Spanish Literature.** Three credit hours. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor in charge must be obtained. Mr. Anibal.

El libro de buen amor, and other works not included in the usual survey courses.

950. Research in Spanish Language or Literature. Autumn, Winter, and Spring Quarters. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor in charge must be obtained. Mr. Hendrix, Mr. Anibal.

This course is designed to meet the needs of individual graduate students who are pursuing a major study in the Department of Romance Languages.

RURAL ECONOMICS

Office, 113 Townshend Hall

PROFESSOR FALCONER, ASSOCIATE PROFESSORS LIVELY, McBRIDE, FOSTER, WERTZ, AND HENNING

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

NOTE: For Marketing courses given in cooperation with other departments, see the following courses.

Animal Husbandry 608. Livestock Marketing.
Animal Husbandry 626. The Marketing of Dairy Products.
Horticulture 628. The Marketing of Fruits and Vegetables.
Poultry Husbandry 603. Marketing and Processing Poultry Products.

* Not given in 1936-1937.

602. Advanced Farm Organization. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Falconer.

A more detailed and advanced consideration of the economic principles involved in farm organization. The application of these principles to current agricultural production problems.

603. Cooperation in Agriculture. Five credit hours. Winter Quarter. Five lectures each week. Mr. Foster.

A study of agricultural cooperation, mainly as found in the United States. The types of cooperative marketing, manufacturing and purchasing organizations, collective bargaining, cooperative credit and insurance.

605. The Agricultural Industry. Three credit hours. Winter Quarter. Three lectures each week. Mr. Falconer.

The importance of the agricultural industry to the welfare of the nation. Some characteristics of the farming industry. Foreign competition, present and prospective. State and federal regulation, encouragement and aid to agriculture in the United States and foreign countries.

606. Rural Sociology. Five credit hours. Autumn Quarter. General prerequisites must include twenty hours in economics, sociology, or rural economics. Mr. Lively.

A general course in the sociology of rural life. Emphasizes the fundamental and conditioning factors in rural social development, rural social institutions and the nature of rural social organization.

607. Rural Social Organization. Four credit hours. Winter Quarter. General prerequisites must include twenty hours in economics, sociology, or rural economics. Mr. Lively.

An intensive course in the theory and technique of rural organization. The characteristics of rural group life, the processes of group organization, and the conditions and factors affecting the nature, permanence and success of groups organized on a local, state, and national basis are given consideration.

608. Rural Social Environment. Three credit hours. Autumn Quarter. General prerequisites must include twenty hours in sociology or its social science equivalent. Mr. Lively.

A detailed study of the environmental factors surrounding rural people and the relation of these factors to their behavior. Particular consideration is given to the mental and social characteristics commonly attributed to country people.

612. Price of Farm Products. Three credit hours. Spring Quarter. Three lectures each week. Mr. Wertz.

A study of the prices of farm land and of farm products. Adjusting the farm business to meet price fluctuations.

613. Marketing Farm Products. Five credit hours. One Quarter. Autumn and Spring. Five lectures each week. Mr. Foster, Mr. McBride.

A study of local and terminal marketing services and agencies involved in the marketing of farm products.

***614. Business Management in Agricultural Marketing.** Three credit hours. Winter Quarter. Two lectures and one laboratory period each week. Given in alternate years. Mr. Foster.

A detailed study of representative agricultural marketing agencies, including their problems of administration, finance, selling, transportation and warehousing.

701. Special Problems. Three to fifteen credit hours, given in units of three or five hours a Quarter for one or more Quarters. Autumn, Winter, Spring. General prerequisites must include at least eight hours of work in the department and the consent of the instructor must be obtained. Mr. Falconer, Mr. Foster, Mr. Lively, Mr. McBride, Mr. Henning, Mr. Wertz.

This course is for students who desire to work out special problems in the field of rural economics and rural sociology.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 86.

950. Research in Rural Economics. Autumn, Winter, and Spring Quarters. Opportunity is offered to carry on special research in agricultural economics and rural sociology. Mr. Falconer, Mr. Foster, Mr. Lively, Mr. McBride, Mr. Wertz.

* Not given in 1936-1937.

SCHOOL ADMINISTRATION
(See Education)

SOCIAL ADMINISTRATION
Office, 112 Commerce Building

PROFESSORS STILLMAN, HAGERTY, NORTH, MARK, PATERSON, AND RAYMOND, ASSOCIATE PROFESSOR DENUNE, ASSISTANT PROFESSORS JONES, BATCHELOR, AND BLACKBURN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

619. Historical Development of Social Case Work. Three credit hours. One Quarter. Autumn and Spring. Open only to graduate students or students majoring in Social Administration. Mr. Raymond.

A study of the forms which social work has taken in the past with special emphasis upon the developments of the last century, which have culminated in present forms and function of social agencies.

Not open to students who have credit for Sociology 619.

620. Community Planning for Child Care. Three credit hours. One Quarter. Winter and Spring. Open only to graduate students or students majoring in Social Administration. Mr. Raymond.

An examination of contemporary programs of child care and protection; regulatory functions of the state in relation to children in their own homes, in institutions, or in foster homes.

Not open to students who have credit for Sociology 620.

626. Penology. Three credit hours. Autumn Quarter. General prerequisites must include Sociology 625. Mr. Hagerty.

The evolution of the methods of criminal procedure with an analysis and criticism of present-day methods. The organization and administration of penal institutions. As visits will be made to courts, jails, and prisons, students who take this course should be free to make these visits Saturday mornings.

Not open to students who have credit for Sociology 626.

627. Social Treatment of Juvenile Delinquents. Three credit hours. Winter Quarter. General prerequisites must include Social Administration 626 or 628. Mr. Hagerty.

The organization and administration of the Juvenile Court. Juvenile Court laws; case studies of juvenile delinquents.

Not open to students who have credit for Sociology 627.

628. Probation and Parole. Three credit hours. Autumn Quarter. Admission by consent of instructor. General prerequisites must include Sociology 625. Mr. Hagerty.

The organization of juvenile and adult probation. Parole methods. The individual treatment of the delinquent. The practice of states having probation and parole systems.

Not open to students who have credit for Sociology 840.

638. Field Work in Social Investigation. Five credit hours. One Quarter. Autumn and Spring. Three class meetings and four hours in field or laboratory each week. Miss Mark, Mr. Blackburn.

Statistical investigation of some phase of social life of the city. Drafting and using of schedules. The statistical interview. Editorial processes. Drafting of tables. Tabulation.

Not open to students who have credit for Sociology 635 and 636 or 638.

639. Social Statistics. Five credit hours. One Quarter. Winter and Spring. Three class meetings and two two-hour laboratory periods each week. Miss Mark, Mr. Blackburn.

The interpretation of statistical data. Averages and ratios, measures of dispersion, graphic presentation, statistical text. A study of the fields of population and vital statistics, statistics of dependency, delinquency, and standard of living.

Not open to students who have credit for Sociology 637 or 639.

642. Case Recording. Three credit hours. One Quarter. Winter and Spring. Open to graduate students by permission of the instructor. Miss Jones.

A study of case history writing and office methods of social case work agencies.

Not open to students who have credit for Sociology 642.

646. Social Organization and Administration of Recreation Facilities. Four credit hours. Winter Quarter. General prerequisites must include Sociology 645. Mr. Batchelor.

Methods and means of control of commercialized recreation with special reference to American cities and towns. The promotion and organization of public and semi-public agencies. The administrative control of playgrounds, social centers, clubs, and other non-commercialized agencies. The coordination of the recreational facilities of the community.

Not open to students who have credit for Sociology 646.

647. The Organization and Direction of Group Activities. Three credit hours. Autumn Quarter. Lectures, readings, practical demonstrations, field work. Open to Seniors in Social Administration and in Education, and graduate students. General prerequisites must include Sociology 645. Mr. Batchelor.

A consideration of the problems and methods of directing boys' and girls' clubs and other similar groups. The use of story telling, group singing, social dramatics, games, including demonstrations and instructing in the various techniques.

Not open to students who have credit for Sociology 647.

649. Camping: Its Organization and Administration. Three credit hours. Spring Quarter. Lectures, readings and field demonstrations. Three class meetings each week. Occasional Saturday mornings will be scheduled for field trips. The course is given jointly by the Departments of Physical Education and Social Administration. General prerequisites for social administration students must include Sociology 645. General prerequisites for physical education students must include fundamental courses in sociology and courses in the Theory of Physical Education. Mr. Batchelor.

The organization and direction of camps, particularly summer camps for boys and girls. Special attention is given to the social and educational program for adolescents. Designed for those preparing for the direction of boys' and girls' work. Practical demonstration in camping will be included.

This course is the same as Physical Education 649.

Not open to students who have credit for Sociology 649.

650. Boys' Work Organization. Four credit hours. Winter Quarter. General prerequisites must include Sociology 645 and Social Administration 646. Mr. Batchelor.

A study of the organization and methods of work of the principal agencies engaged in boys' work, such as the Boy Scouts, Young Men's Christian Association, Settlement Clubs for Boys. The principal part of the instruction will be given by specialists from the various agencies.

Not open to students who have credit for Sociology 650.

651. Girls' Work Organization. Four credit hours. Winter Quarter. General prerequisites must include Sociology 645 and Social Administration 646. Mr. Batchelor.

A study of the plan of organization and methods of work of the principal agencies engaged in girls' work, such as the Girl Scouts, Camp Fire Girls, Young Women's Christian Association, Settlement Clubs for Girls. The principal part of the instruction will be given by specialists from the various agencies.

Not open to students who have credit for Sociology 651.

657. Welfare Problems in Rural Communities. Four credit hours. Winter Quarter. Given in alternate years. Mr. Denune.

A consideration of health, child welfare, dependency, defectiveness, delinquency, and recreation. This course is designed to give rural teachers, ministers, and social workers a knowledge of the welfare problems which exist in rural communities and the methods by which they are being approached by rural workers.

Not open to students who have credit for Sociology 657.

670-†671. Community Health Organization. Three credit hours. Winter Quarter, 670; Summer Quarter, 670 and 671. Mr. Paterson.

Methods of organization. Determination and development of programs and budgets. Administrative problems. Relation of voluntary and official health organizations.

Not open to students who have credit for Sociology 670-671.

672. Medical Social Work. Three credit hours. Winter Quarter.

A presentation of the social aspects of preventable diseases; the techniques of securing and using expert medical information; the clinical interpretation of specific disease problems, growth and nutrition; pregnancy and medical procedures.

673. Psychiatric Social Work. Three credit hours. Spring Quarter. General prerequisites must include Social Administration 672.

An introductory course in psychiatry for students of social work, to give some understanding of normal human behavior as well as what constitutes abnormal behavior.

675. Field Work. Six to fifteen credit hours. One Quarter. Summer, Autumn, Winter, Spring. Open by permission of the instructor. Case Work, Miss Jones; Social Research, Miss Mark; Group Work, Mr. Batchelor.

Practical work in the fields of family and child welfare, penology, health, industry, or recreation under the supervision of organizations in these fields and the instructor.

Not open to students who have credit for Sociology 675.

676. The Field of Social Work. Two credit hours. Autumn Quarter.

An introduction to contemporary social work, its objectives and processes; its relationship to other social forces; its historical development.

679. Legal Aspects of Social Work. Three credit hours. Autumn Quarter.

Discussion of the law as a means of social control; study of case law and statutes relating to those fields of the law which are of greatest concern to the social worker; the legal aid movement in the United States.

***690. Social Case Work.** Three credit hours. Autumn Quarter. Special course open to workers, recommended by the Franklin County Relief Administration and approved by the department, who qualify for ranking as juniors or above at the University.

Principles, methods, and technique of social treatment with particular reference to the administration of unemployment relief.

Not open to students who have credit for Social Administration 695.

695-696. Social Case Work. Five credit hours. 695, Autumn Quarter; 696, Winter Quarter. Open by permission of the instructor. Miss Jones.

An introductory course in the methods of social case work with particular reference to the family welfare field.

Not open to students who have credit for Sociology 695-696.

697. The Case Method in Group Work. Three credit hours. Spring Quarter. General prerequisites must include Social Administration 695 and senior standing in Group Work.

The application of the case method to organized group work. The techniques of interviewing, recording, diagnosing, interpretation of data, and treatment, with particular reference to the needs of group work students. Lectures, discussions, and field work.

Not open to students who have credit for Sociology 697.

700. Special Problems. One to four credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include fundamental courses in Sociology, and permission of instructor must be obtained.

Individual study in some field of social interest.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

813. The Community Chest Movement. Four credit hours. Autumn Quarter. Mr. Stillman.

Origin, development and present status. The business end of a Community Chest and its

† Not given during the academic year, 1936-1937.

* Not given in 1936-1937.

place in the field of welfare finance. Study of and report upon the Columbus Community Fund campaign for funds. Analysis of paper organizations of Community Chests of other cities.

Not open to students who have credit for Sociology 813.

814. Contemporary Social Work. Four credit hours. Winter Quarter. General prerequisites must include Social Administration 813. Mr. Stillman.

An analysis of programs as actually operative in American communities. Methods of coordination in social work. The Community Chest and Councils of Social Agencies. Making a community program. Functional groupings in the field of social work.

Not open to students who have credit for Sociology 814.

†815. Interpretation of Social Work. Four credit hours. General prerequisites must include Social Administration 813 and 814. Mr. Stillman.

The place of education in a social work program. The message and the method of educational publicity.

Not open to students who have credit for Sociology 815.

835. The Social Worker and Community Groups. Three credit hours. Autumn Quarter. Mr. Stillman.

The social work executive as a specialist in the field of community planning.

Not open to students who have credit for Sociology 835.

836. National Social Work Agencies and Local Programs. Three credit hours. Winter Quarter. General prerequisites must include Social Administration 813. Mr. Stillman.

Their historical development and influence. Contractual relations. Promotion. Education. Specialism. Standards.

Not open to students who have credit for Sociology 836.

†837. Budgeting Community Social Work. Three credit hours. General prerequisites must include Social Administration 813 and 814. Mr. Stillman.

Principles and methods of budgeting. The budget in relation to money raising and social planning.

Not open to students who have credit for Sociology 837.

838. Social Case Work. Three credit hours. Autumn Quarter. Mr. Batchelor.

An analysis of present trends in family case work. Consideration of the techniques of diagnosis and treatment. The significance of present-day relief practices.

Not open to students who have credit for Sociology 838.

839. Interviewing in Social Case Work. Three credit hours. Autumn Quarter. General prerequisites must include Social Administration 695-696 and permission of the instructor.

A course to assist the student in acquiring facility in interviewing. Through case material and practice a study of ways in which the skill of social workers is used.

***841. Public Welfare Administration.** Three credit hours.

Principles of the administration of public welfare. Emphasis on Emergency Relief Administration, budgetary procedure, social planning and personnel.

***842. Public Welfare Administration.** Three credit hours. Autumn, Winter, Spring, and Summer Quarters. General prerequisites must include Social Administration 841. Open only to graduate students in Social Administration.

Provisions for public assistance including consideration of the administration of the poor law, aid to mothers, and for the aged, and unemployment assistance.

†843. The Administration of Social Work Agencies. Three credit hours. General prerequisites must include Social Administration 676.

An introduction to the basic factors in the administration of social agencies.

845-846. Methods of Social Investigation. Four credit hours. Autumn and Winter Quarters. Required of candidates for advanced degrees in sociology who have not had equivalent work. Miss Mark, Mr. Blackburn.

A course designed to prepare students to do independent social research. Students will undertake a class project involving the collection of data.

Not open to students who have credit for Sociology 635-636-637 or 685-686-687 or 845-846.

* Not given in 1936-1937.

† Not given during the academic year, 1936-1937.

847-848-849. Research in Penology. One to four credit hours. Autumn, Winter, and Spring Quarters. Open on consent of the instructor. It is assumed that the student who takes this course shall have had one year's work in criminology and penology. Mr. Hagerty.

950. Research in Social Administration. Autumn, Winter, and Spring Quarters. Penology, Mr. Hagerty; social movements, their history, organization, methods, Mr. North; social statistics, Miss Mark, Mr. Blackburn; social work administration, Mr. Stillman; public health, Mr. Paterson; rural social institutions, Mr. Denune; social case work, Miss Jones; recreation or group work, Mr. ————.

SOCIOLOGY

Office, 111 Commerce Building

PROFESSORS LUMLEY, HAGERTY, NORTH, AND MARK, ASSOCIATE PROFESSOR DENUNE, ASSISTANT PROFESSORS COOK AND BATCHELOR, MISS SPAETH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. The Family. Four credit hours. One Quarter. Autumn and Spring. Miss Spaeth.

A survey of types of family organization from primitive times to the present; an analysis of the factors that entered into their development; the modern family and an analysis of modern family problems.

605. The Immigrant. Four credit hours. Winter Quarter. Mr. Cook.

Role played by immigrant groups within the United States. Analysis of 1930 Census; migrations to and within the United States; vitality of minority peoples; cultural heritages; economic relations; citizenship; family relations; leisure-time activities; the school and race relations; the church; art; present status of minority peoples; immigrant adjustment.

607. Race Contacts and Culture Conflicts. Four credit hours. Spring Quarter. Mr. Cook.

Survey of contemporary race contacts and cultural conflicts arising from the spread of the Euro-American mode of life over the less advanced areas of the world.

608. The Negro in American Life. Four credit hours. Autumn Quarter. Mr. Cook.

A study of the conflict situations, attitudes, and progress of the Negro and methods of dealing with interracial problems.

610. The Standard of Living. Four credit hours. Spring Quarter. Four class meetings each week. Miss Mark.

A consideration of the content of the various standards of living in American society, their economic and social significance. Problems in family budget and retail buying.

Not open to students who have credit for Economics 644.

***612. Primitive Social Organization.** Three credit hours. Spring Quarter. Textbook, lectures, papers, and discussions. Given in alternate years. Miss Spaeth.

A study and analysis of types of social organization of primitive man, such as clan, family, political organization, religion, etc.

Not open to students who have credit for Sociology 412.

618. Poverty. Three credit hours. Winter Quarter. Mr. Hagerty.

Extent, nature, and causes of poverty. Outlines of a program of prevention. The relation of the standard of living to social welfare. The relation of minimum wage laws to poverty.

625. The Criminal. Three credit hours. Spring Quarter. Mr. Hagerty.

The social, economic, and physiological causes of crime. The changing character of crime as modified by the legal code. Types of criminals, the instinctive, habitual, professional, etc.

* Not given in 1936-1937.

The classical and positive schools of criminology. The relation of feeble-mindedness and degeneracy to crime. Juvenile crime, its causes and prevention.

645. Leisure and Recreation. Four credit hours. Autumn Quarter.

The sources of leisure in early and modern society. The social significence and uses of leisure. The social functions of play. Historical aspects of play. The recreation problem of modern communities from the standpoint of control and of public provision.

656. Rural Social Institutions. Four credit hours. Autumn Quarter. Mr. Denune.

The problems of health, recreation, social intercourse, housing, child welfare, dependency, defectiveness, and delinquency in American rural communities and small towns. The agencies and organizations dealing with these problems.

665. Social Order and Social Control. Three credit hours. Autumn Quarter. Textbooks, lectures, papers, and discussions. Mr. Lumley.

A study of the various features of social control and the social order; the chief control devices or methods; agents, both private and public; institutional pressures; disruptive factors; the nature of social order. Additional readings for graduate credit.

666. Social Evolution. Three credit hours. Winter Quarter. Textbooks, lectures, papers, and discussions. Mr. Lumley.

A systematic study of the methods of social evolution such as variation, selection, transmission, adaptation. Additional readings for graduate credit.

667. Social Progress. Three credit hours. Spring Quarter. Textbooks, lectures, papers, and discussions. Mr. Hagerty.

A study of the various theories and the criteria of social progress. Extra readings for graduate credit.

672-673. Recent Social Problems. Three credit hours. Autumn and Winter Quarters.

Analysis of contemporary social trends. The sociological implications of current social changes and effects upon the family, church, school, delinquency, recreation, and community life and culture. Lectures, assigned readings, papers, and discussion.

676. Social Classes. Four credit hours. Autumn Quarter. Four class meetings each week. General prerequisites must include Sociology 401-402.

A study of the basis of individual and group differentiation and the development of cooperation and conflict growing out of contemporary situations.

Not open to students who have credit for Sociology 828.

677. Social Changes Through Crisis. Four credit hours. Winter Quarter. Four class meetings each week. General prerequisites must include Sociology 401-402.

Theories and movements of social reconstruction. Historical survey of Utopias and other earlier schemes of reform. Critical analysis of the methods and objectives of modern radical programs of social organization. Revolution versus gradualism as a method of social change.

Not open to students who have credit for Sociology 829.

700. Special Problems. One to four credit hours. Autumn, Winter, and Spring Quarters.

Individual study in some field of social interest.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

All candidates for degrees are required to register for Sociology 900 or Social Administration 845-846. All graduate students are required to attend and make occasional reports at a noncredit discussion meeting of faculty and students held every two weeks.

801-802-803. History of Sociological Thought. Two credit hours. Autumn, Winter, and Spring Quarters. One session each week. Readings, reports, lectures, and discussions. Mr. Lumley.

A survey of the most important literature of sociological theory, preceded by an examination of the writings of the Utopians, the philosophers of history and the social reformers.

805-806-807. American Sociological Theory. Two credit hours. Autumn, Winter, and Spring Quarters. One session each week. Readings, reports, lectures, and discussions. Mr. Hagerty.

An intensive study of the theories concerning the origin, development, forms and nature of society, advanced by the leading American sociologists.

***820. Seminary in Anthropology.** Two credit hours.

***827. Nationality and Nationalism.** Four credit hours. Autumn Quarter.

A survey of the religious, economic, political, and social backgrounds which underlie the contemporary development of national attitudes.

860. Seminary in Sociology. Four credit hours. Autumn, Winter, and Spring Quarters. Mr. North.

Social planning and social reconstruction.

900. Contemporary Sociological Literature. One to four credit hours. Autumn Quarter, Mr. North; Winter Quarter, Mr. Denune; Spring Quarter, Mr. Lumley.

950. Research in Sociology. Autumn, Winter, and Spring Quarters. Criminology, Mr. Hagerty; social movements, their history, organization, methods, Mr. North; history of sociological thought, social control, social evolution, Mr. Lumley; human migration and race problems, Mr. Cook; rural social institutions, Mr. Denune; anthropology and the family, Miss Spaeth.

Individual projects selected and prosecuted in consultation with the instructor.

SOILS

(See Agronomy)

SPANISH

(See Romance Languages and Literatures)

SPECIAL EDUCATION

(See Bureau of Special and Adult Education)

SPEECH

Majors in Speech may be carried in the English Department (but not beyond the Master's degree) or in the Phonetics Division. See courses in the Drama and Public Speaking under English; courses in Speech Pathology, Speech and Hearing Clinic, Speech Science, and Pronunciation under Phonetics Division.

SURVEY COURSES

PROFESSORS HENDERSON, LEIGHTON, SPIEKER, AND ODEGARD, ASSOCIATE PROFESSOR ZORBAUGH, DEAN GAW

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. Prerequisite, permission of the instructor in charge who will decide in each individual case whether the student has had the necessary training to profit from the course.

605. Foundations of Contemporary Civilization. Five credit hours. One Quarter. Autumn and Winter. Five meetings each week. Mr. Leighton, Mr. Odegard.

This course is designed for all students majoring in subjects falling within the fields of biological and inorganic sciences, mathematics and psychology. It is elective to other students

* Not given in 1936-1937.

and may be taken in the second Quarter of the Junior year. It is designed to afford the mature student some insight into the progress of thought in a great province of life to which he has given relatively little attention during his course. The course deals with the changes of thought in religion, ethics, social and political philosophy in relation to the general intellectual and social changes of modern civilization. It concludes with a brief discussion of the chief problems of our present civilization.

608. Development of Modern Science. Five credit hours. One Quarter. Autumn and Winter. Five meetings each week. Mr. Henderson, Mr. Spieker.

This course is designed especially for students who have not majored in science. Its purpose is to give the non-science student a general view of the historical development of scientific ideas, and to dwell upon the nature and validity of scientific hypotheses and theories from a scientific point of view.

664. Student Economic Problems and the Adviser. Three credit hours. One Quarter. Autumn and Spring. General prerequisites must include an elementary course in economics or the consent of the instructor must be obtained. Miss Zorbaugh.

This course is for advisers of students in colleges, universities, and high schools and is open to both men and women.

An economic approach to the functions of an adviser of women students. Fundamental student interests and problems, both short-time and long-time, will be studied in the light of economic principles and of a philosophy which envisions maximum efficiency in women as both producers and consumers. Provision is made for actual experience in counseling students under provision of the instructor.

It is advisable to supplement this course by Survey 665. Economics 645 is recommended.

Not open to students who have credit for Psychology 664.

665. Principles of Psychology for Advisers. Three credit hours. One Quarter. Autumn and Winter. General prerequisites must include fundamental courses in psychology or the consent of the instructor must be obtained. Mrs. Gaw.

This course is for advisers of students in colleges, universities, and high schools.

Students may have actual experience in advising younger students under the supervision of the Dean of Women. They will be taught how to advise concerning the scholastic and social orientation of students, and the use and interpretation of records and scholarship as bearing on the personality of the student.

It is advisable to supplement this course by Survey 664.

Not open to students who have credit for Psychology 665.

VETERINARY ANATOMY

Office, 204 Veterinary Laboratory

PROFESSOR GROSSMAN, MR. HAUPERT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

601. Advanced Veterinary Anatomy. Three to five credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include a course in the topographic anatomy of domestic animals. Mr. Grossman.

Not open to students who have credit for Veterinary Medicine 625.

608. Histologic Technique. Two to five credit hours. One Quarter. Autumn, Winter, Spring. Laboratory work, three hours for each credit hour. General prerequisites should include courses in the histology and embryology of the domesticated animals. Students electing this course should consult with the instructor in charge. Mr. Grossman, Mr. Haupert.

The course deals with the examination of the tissues with the aid of microscope. The important methods in the preparatory steps required in collecting specimens, fixation, embedding, sectioning, staining, and mounting are considered.

Not open to students who have credit for Veterinary Medicine 620.

VETERINARY CLINICS
Office, 115 Veterinary Clinic

PROFESSORS GUARD, BRUMLEY, GOSS, SCHALK, HOBBS, DONHAM, AND REBRASSIER, ASSOCIATE PROFESSOR SHOEMAKER (EMERITUS), ASSISTANT PROFESSOR KRILL, MR. ASHCRAFT, MR. DEEM, MR. ELSASSER

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

801-802-803. Special Problems in Clinics. Three to ten credit hours. All Quarters. Mr. Guard and clinical staff.
A course intended to give the student more intensive clinical experience.

810. Advanced Clinical Technique. Three to ten credit hours. All Quarters. Mr. Guard and clinical staff.
A course intended to give the student more intensive clinical experience.

VETERINARY MEDICINE
Office, 103 Veterinary Laboratory

PROFESSORS BRUMLEY, SCHALK, HOBBS, AND DONHAM

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

626. Special Problems in Veterinary Medicine. Two to five credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Brumley, Mr. Schalk, Mr. Hobbs, Mr. Edgington, Mr. Donham.

VETERINARY PARASITOLOGY
Office, 4 Veterinary Laboratory

PROFESSOR REBRASSIER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

623. Advanced Veterinary Parasitology. Two to five credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Rebrassier.
Not open to students who have credit for Veterinary Medicine 623.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

826. Research Problems in Parasitology. Five credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Rebrassier.
Not open to students who have credit for Veterinary Medicine 826.

VETERINARY PATHOLOGY

Office, 135 Veterinary Clinic

PROFESSOR GOSS, MR. ELSASSER, AND ASSISTANTS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

610. Pathology Technique. Two to five credit hours. Each Quarter. Autumn, Winter, Spring. Laboratory work, three hours for each credit hour. Mr. Goss.

Practice in the methods of laboratory diagnosis, consisting of collecting the specimens, their fixation and embedding, and the sectioning of such tissues, together with practice in laboratory diagnosis and the recognition of disease processes in tissues.

Not open to students who have credit for Veterinary Medicine 821 or 621.

615. Advanced Special Pathology. Two to five credit hours. Each Quarter. Autumn, Winter, Spring. Laboratory work, three hours for each credit hour. General prerequisites must include Veterinary Medicine 621 or Veterinary Pathology 610. Mr. Goss.

An advanced course in the pathology of infectious diseases with special reference to anatomical and microscopical lesions and methods of diagnosis together with detailed studies of the lesions of specified diseases under consideration.

Not open to students who have credit for Veterinary Medicine 622.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

801. Special Anatomical Pathology. Three to ten credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Goss.

Special problems in gross and microscopic pathology with regard to the accommodation of the course to particular projects which may be given due consideration.

805. Special Bovine Pathology. Three to ten credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Goss.

This is to accommodate those students doing graduate work in some special fields of bovine pathology. The selection of projects is quite variable, allowing for special problems in this field.

815. Special Poultry Pathology. Three to ten credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Goss.

This course allows for the study of poultry diseases with specialization in any pathological processes concerned with poultry diseases.

VETERINARY RESEARCH

Office, Animal Disease Laboratories, Reynoldsburg, Ohio

ASSOCIATE PROFESSOR EDGINGTON (IN CHARGE), PROFESSORS BRUMLEY, SCHALK, AND REBRASSIER, MR. MINGLE, MR. WOODHOUSE

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

The departmental laboratories wherein the major portion of the active work is conducted are located near Reynoldsburg, about ten miles from Columbus. Here well-equipped laboratories and facilities for housing and isolation of experimental animals, including poultry, are available. These laboratories represent a focal point for the animal disease investigations of the Veterinary College, Ohio Agricultural Experiment Station, and the Department of Agriculture of Ohio.

The work of the department is of interest primarily to advanced and graduate students, but information regarding various projects under study is available to other courses presented by the College.

The facilities of the department provide ample opportunities for the interested and able veterinary student to pursue a variety of studies under the direction of the staff.

950. Veterinary Research. Autumn, Winter, and Spring Quarters. General prerequisites must include satisfactory evidence of an interest in and ability to pursue the projects undertaken.

This course is designed to accommodate the needs in different lines of veterinary research. The work will be outlined by the instructor to meet the requirements of the individual student.

While research primarily in the fields of infectious, parasitic, and nutritional diseases is under the supervision of the staff members, Dr. Edgington, Dr. Rebrassier, and Dr. Schalk, other lines of study may be arranged under appropriate leadership. A close working relationship is maintained by the entire staff on all problems under consideration in the department.

VETERINARY SURGERY
Office, 115 Veterinary Clinic

PROFESSORS GUARD AND DONHAM, ASSOCIATE PROFESSOR SHOEMAKER (EMERITUS), ASSISTANT PROFESSOR KRILL, MR. KNAPP

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

624. Special Problems in Veterinary Surgery. One to five credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Guard.

Advanced work in surgery or sterility.

VOCATIONAL EDUCATION
(See Education)

ZOOLOGY AND ENTOMOLOGY
Office, 101 Botany and Zoology Building

PROFESSORS OSBURN, OSBORN (EMERITUS), BARROWS, DeLONG, PETERSON, KENNEDY, AND SNYDER, ASSOCIATE PROFESSORS D. F. MILLER AND PRICE, ASSISTANT PROFESSORS KOSTIR, J. A. MILLER, AND KNULL, MR. SCHOTT

ZOOLOGY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

Requirements for Advanced Degrees: In addition to the fixed requirements of the University, the Department of Zoology and Entomology requires that the candidate for the Master's degree shall have had, at the time of the comprehensive examination, fundamental training in the following subjects: organic or biological or agricultural chemistry, botany and any three of the following groups: anatomy or vertebrate zoology, invertebrate zoology, embryology, or genetics, plant or animal physiology, plant pathology or bacteriology. Additional requirements in the special field in which the degree is taken will be indicated by the adviser. The candidate for the Doctor's degree, in addition to the fixed requirements of the University and all of the groups indicated above, shall have had at the time of the comprehensive examination, a fundamental knowledge of the following subjects: college algebra and statistics, physics, ecology and geology or evolution, besides familiarity with the current literature. Additional requirements in the special field of research will be indicated by the adviser.

601. Advanced Genetics. Three credit hours. One Quarter. Autumn and Winter. Three lecture-discussion periods each week. Mr. Snyder.

This is largely a study of human inheritance, with especial emphasis on the methods of research in this branch of genetics. The mathematical analysis of human pedigrees is intensively studied.

***605. Animal Behavior.** Three credit hours. Autumn Quarter. One lecture each week, the remainder laboratory work. Given in alternate years. In

* Not given in 1936-1937.

addition to the general prerequisites, permission of the instructor must be obtained. Mr. Barrows.

This course is devoted to the study of the functions of the various parts of the nervous system of the invertebrates, with emphasis on the mechanics of adjustment to heat, light, chemical, and mechanical stimuation. Considerable time will be spent on experiments with living worms and insects.

609. Animal Microtechnic. Three or five credit hours. Autumn Quarter. A laboratory course. Laboratory work, assigned readings, and conferences. This course is designed for students intending to major in one of the biological sciences. The class is limited to twelve students and permission of the instructor must be obtained before registering for the course. Mr. Kostir.

Theory and practice of microscopic methods, including fixing, embedding, sectioning, and staining of animal tissues, making permanent preparations, and special manipulation of the microscope and its accessories.

Not open to students who have credit for Zoology 407.

617. Cellular Biology I. Three or five credit hours. Winter Quarter. Three lectures and two two-hour laboratory periods each week. Permission of the instructor must be obtained before registering for this course. Mr. Kostir.

A study of the organization of living cells and the fundamental phenomena of life.

618. Cellular Biology II. Three or five credit hours. Spring Quarter. Three lectures and two two-hour laboratory periods each week. General prerequisites must include a course in heredity. Zoology 617 is desirable, but not essential. Mr. Kostir.

A study of the physical basis of heredity, variation, and evolution.

620. Advanced Zoology of Vertebrates. Five credit hours. Spring Quarter. Three lectures and two two-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. A course in evolution and one Quarter in comparative anatomy are also desirable. Mr. Price.

A study of the various vertebrate groups, emphasizing their origin, phylogeny, classification, life histories, habits, distribution, and economic importance. Laboratory, museum and field work. Especially recommended for students specializing in biological science.

625. Advanced Zoology of Invertebrates I. The Protozoa. Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. Mr. Kostir.

Zoology 625, 626, and 627 are fundamental courses designed to give the student a general knowledge of the structure, life histories, habits, and relationships of the invertebrate animals. While it is preferable that these courses be taken in the order given, this is not essential, and any one of the three may be elected independently of the others. Course 625 deals with the Protozoa, including both free-living and parasitic forms.

Not open to students who have credit for Zoology 615.

626. Advanced Zoology of Invertebrates II. Five credit hours. Winter Quarter. Two lectures and three two-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. Mr. Kostir.

A study of the structure, life histories, habits and relationships of sponges, coelenterates, worms, and arthropods, together with the consideration of important biological principles illustrated by these groups. Note statement under Zoology 625.

Not open to students who have credit for Zoology 616.

627. Advanced Zoology of Invertebrates III. Five credit hours. Spring Quarter. Two lectures and three two-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. Mr. Kostir.

A study of the structure, life histories, habits and relationships of molluscs, echinoderms, brachiopods, and bryozoa, together with the consideration of important biological principles illustrated by these groups. Note statement under Zoology 625.

630. The Interpretation of Biological Data. Five credit hours. Winter Quarter. Three lectures and two two-hour laboratory periods each week. Permission of instructor must be obtained before registering for this course. Mr. Schott.

A study of biological variability, methods of classification and analysis, based on bio-

metrical usage. The methods of collecting and assembling data and the consideration of their biological validity will be stressed.

701. Special Problems. Three or five credit hours each Quarter. Autumn, Winter, Spring. A student may enter at the beginning of any Quarter. General prerequisites must include satisfactory preparation for individual work in the field of the chosen problem. The student may have free choice of the instructor under whom he desires to work, but the permission of the instructor must be obtained before registering for the course. The staff.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 683.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

These prerequisites include an adequate knowledge not only of zoology but also of related sciences. It is desirable that the student should have a reading knowledge of French and German.

801-802-803. Seminary in Zoology. One credit hour. Autumn, Winter, and Spring Quarters. Mr. Osburn, Mr. Kostir, Mr. Schott.

Discussion of assigned subjects, reports on research work, current literature, etc. All graduate students in the department are expected to register in this course as long as they are in residence.

805-806-807. Invertebrate Zoology. Five credit hours. Autumn, Winter, and Spring Quarters. Mr. Osburn.

A detailed study of invertebrate groups with special reference to morphologic features and discussions of their significance in adaptation, phylogeny, and taxonomy.

***808-*809. Invertebrate Embryology.** Three or five credit hours. Autumn and Winter Quarters. Lectures, reading, and laboratory. General prerequisites must include the equivalent of Entomology 651-652, or Zoology 805-806-807. Mr. Osburn.

810. Research Methods: General. Five credit hours. Winter Quarter. Three lectures and two laboratory periods each week. Open to graduate students with the consent of the instructor. Mr. D. F. Miller.

Designed for students interested in research in experimental biology. It deals with the technics and the methods of attacking problems of research and with the principal types of apparatus and devices that may be used in experimentation. Particular emphasis is placed upon the analysis and control of such factors as spectral energy radiations, moisture and humidity, air, food, gravity, etc. Some time will be devoted also to the manner of accumulating data, its organization and its expression for presentation in reports and publication. The emphasis may be shifted at times to suit the needs of the class.

950. Research in Zoology. Autumn, Winter, and Spring Quarters. Mr. Osburn, Mr. Osborn, Mr. Barrows, Mr. DeLong, Mr. Peterson, Mr. Kennedy, Mr. Kostir, Mr. Snyder, Mr. Price.

Problems in development, life history, morphology, ecology, genetics, animal behavior, parasitology, taxonomy, or other zoological or entomological subjects may be undertaken. For some of these the opportunities are particularly good in summer at the Biological Laboratory. Students interested should send for the Franz Theodore Stone Laboratory Bulletin.

ENTOMOLOGY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

651-652. Advanced Entomology. Five credit hours. Autumn and Winter Quarters. Two lectures and three two-hour laboratory periods each week. Mr. Kennedy.

Advanced entomology for those wishing to investigate some special group of insects or to fit themselves for professional work in entomology.

* Not given in 1936-1937.

Entomology 651 deals with the comparative external morphology, the evolutionary history and classification of insects; laboratory work is systematic and material will be furnished, but it will be preferable if the student collects and pins material for himself during the summer preceding.

Entomology 652 deals with insect behavior, life histories, and particularly with ecological principles governing occurrence and distribution of insect species, and the principles underlying insect control.

The laboratory work is systematic. The two Quarters cover all the insect orders.

653-654. Insect Control. Five credit hours. Autumn and Spring Quarters. Two lectures and three laboratory periods each week. Mr. DeLong.

Principles of economic entomology, circumvention and exclusion, cultural methods, traps and trap crops, heat, animal dips, insecticides, insecticide machinery, and accessories, and practical work in fumigation, spraying, inspecting, preparing an entomological exhibit and a collection of economic insects, rearing and insectary methods. Practical course intended to anticipate, so far as possible, the requirements and difficulties which the student will encounter in state or federal entomological work.

***655. Medical and Veterinary Entomology.** Five credit hours. Winter Quarter. Three lectures and two laboratory periods each week. Given biennially. Mr. DeLong.

The insects, mites, and ticks which cause or transmit diseases of man and domestic animals; the sources of infection, methods of transmission and interrelation with pathogenic bacteria and protozoa; the relations of the subjects to parasitology, bacteriology, veterinary medicine, sanitary engineering and public health; field observations of unsanitary conditions, practice in feeding, breeding and handling experimental insects, and practical problems in the control of parasites and insect-borne diseases.

The student is advised if possible to take Zoology 504 (Animal Parasites) before electing this course.

660. Entomological Literature and Principles of Taxonomy. Five credit hours. Winter Quarter. Mr. Kennedy.

Lectures on the development of entomological writing, studies of Government and Experiment Station bulletins and other publications, assigned readings, and preparation by each student of a report or review upon some publication. Intended to familiarize the student with past and current publications and give him command of the published records in his field of study.

A study of the principles of classification with lectures on taxonomic systems, codes of nomenclature, etc. Practical work in the classification of a selected group or groups of insects or other animals.

Not open to students who have credit for Entomology 456.

701. Special Problems. Three or five credit hours each Quarter. Autumn, Winter, Spring. A student may enter at the beginning of any Quarter. General prerequisites must include satisfactory preparation for individual work in the field of the chosen problem. The student may have free choice of the instructor under whom he desires to work, but the permission of the instructor must be obtained before registering for the course. The staff.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 36.

801-802-803. Seminary in Entomology. One credit hour. Autumn, Winter, and Spring Quarters. Mr. DeLong, Mr. Peterson, Mr. Kennedy.

Discussion of assigned subjects, reports on research work, current literature, etc. All graduate students in the department are expected to register in this course as long as they are in residence.

814-815. Biological Control of Insect Pests. Five credit hours. Autumn and Winter Quarters. Three lectures and two two-hour laboratory periods each week. Each Quarter is a unit in itself and may be taken independently of the other. Open to graduate students in entomology with the consent of the instructor. Mr. Peterson.

An advanced course dealing with the biological agents which bring about a balance or control among insects. During the Autumn Quarter diseases of insects, chiefly bacterial and

* Not given in 1936-1937.

fungous, and vertebrate and invertebrate predators of insects will be considered. During the Winter Quarter parasites of insects, chiefly parasitic insects, will be considered. The laboratory work will consist largely of special assigned problems.

816. Research Methods: Living Insects. Five credit hours. Spring Quarter. Three lecture hours and two two-hour laboratory periods each week. Open to graduate students with the consent of the instructor. It is advisable to have Zoology 810 previous to this course. Mr. Peterson.

A course designed for the purpose of introducing students to methods and equipment employed today by research entomologists in their ecological studies of living insects. Particular attention will be paid to methods of measuring environmental factors in the field, methods of conducting life history studies, trapping insects, sampling and estimating insect populations and other useful information for entomologists now in or preparing to enter field research work. The laboratory will consist largely of special assigned problems.

817. Morphology and Development of Insects. Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. Mr. Kennedy.

An advanced comprehensive course on the internal structures of insects, together with what is known of their functions, morphology, histology, embryology, and metamorphosis. The laboratory is handled as an individual research problem for each student and may be continued in succeeding Quarters as research.

The success of this work depends on the material collected and preserved by the student preceding the course. Methods for collecting and preserving material should be taken up with the instructor in charge at the end of the Spring Quarter preceding. Students coming from other institutions are expected to write for instructions.

Not open to students who have credit for Entomology 656.

818. Classification of Immature Insects. Three to five credit hours. Autumn Quarter. One hour lecture and four or eight hours of laboratory each week. Open to graduate students in entomology with the consent of the instructor. Mr. Peterson.

A course dealing with the identification of field collected and preserved insects. The principal groups will be larvae of insects that have complete metamorphosis.

950. Research in Entomology. Autumn, Winter, and Spring Quarters. Mr. Osburn, Mr. Barrows, Mr. Peterson, Mr. DeLong, Mr. Kennedy, Mr. D. F. Miller.

Problems in development, life history, morphology, ecology, genetics, animal behavior, parasitology, taxonomy, or other zoological or entomological subjects may be undertaken. For some of these the opportunities are particularly good in summer at the Biological Laboratory. Students interested should send for the Franz Theodore Stone Laboratory Bulletin.

BULLETINS ISSUED ANNUALLY BY OHIO STATE UNIVERSITY

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Junior School of Agriculture

School of Home Economics

College of Arts and Sciences

College of Commerce and Administration

School of Journalism

School of Social Administration

College of Dentistry

College of Education

Fine Arts

Music

School of Nursing

College of Engineering

College of Law

College of Medicine

College of Pharmacy

College of Veterinary Medicine

Applied Optics

Annual Report

Franz Theodore Stone Laboratory (Formerly Lake Laboratory)

General Catalogue Number*

Information for Prospective Students

Summer Quarter

Time Schedule

University Directory*

Short Courses in Agriculture

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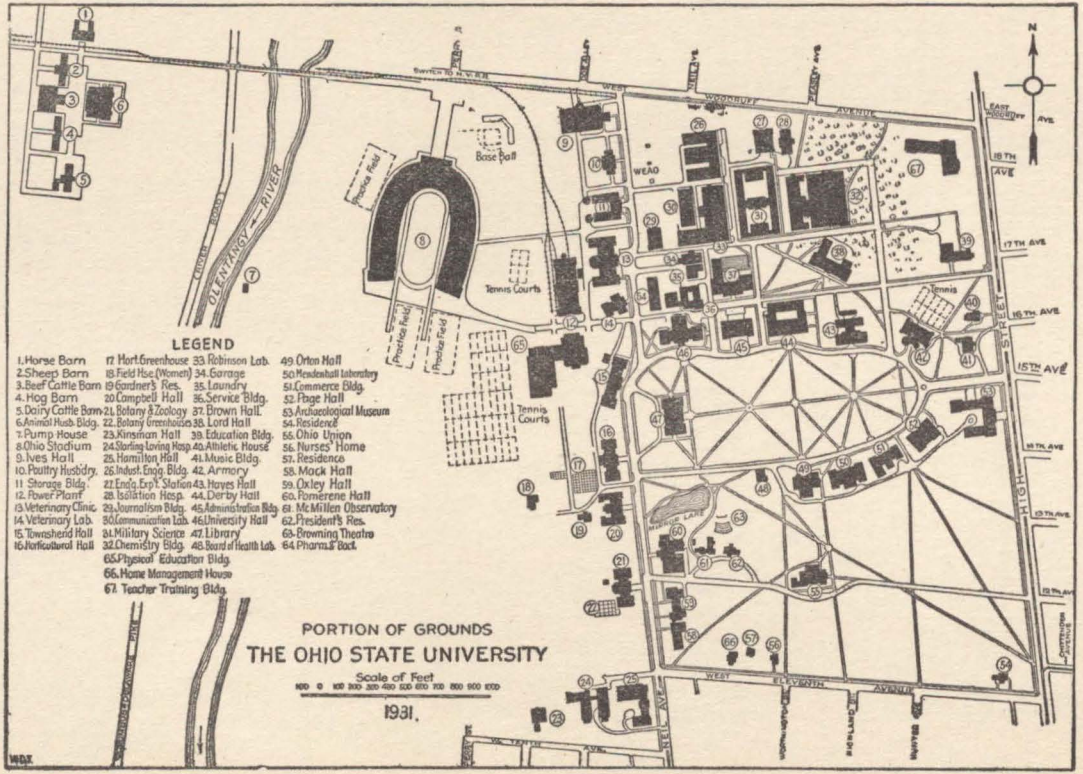
* The General Catalogue Number and the University Directory are distributed without charge for official purposes. To individuals, the price of the General Catalogue Number is 50 cents a copy and the University Directory 25 cents.


N
OLENTANGY RIVER
Base Ball
Practice Field
Practice Field
Practice Field
Tennis Courts
Tennis Courts
Tennis
WEAO
NORTHWEST AVENUE
EAST WOODRUFF AVE.
18TH AVE
17TH AVE
16TH AVE
15TH AVE
14TH AVE
13TH AVE
12TH AVE
SIXTH AVE
HIGH
WEST ELEVENTH AVENUE
NEIL AVE.
NORTH
NEIL AVE.
ARLINGTON
NORTH
LEGEND
1. Horse Barn
2. Sheep Barn
3. Beef Cattle Barn
4. Hog Barn
5. Dairy Cattle Barn
6. Animal Husb. Bldg.
7. Pump House
8. Ohio Stadium
9. Ives Hall
10. Poultry Husbdry.
11. Storage Bldg.
12. Power Plant
13. Veterinary Clinic
14. Veterinary Lab.
15. Townshend Hall
16. Horticultural Hall
17. Hort. Greenhouse
18. Field Hse. (Women)
19. Gardner's Res.
20. Campbell Hall
21. Botany & Zoology
22. Botany Greenhouse
23. Kinsman Hall
24. Sterling Loving Hosp.
25. Hamilton Hall
26. Indust. Engg. Bldg.
27. Engg. Exp't. Station
28. Isolation Hosp.
29. Journalism Bldg.
30. Communication Lab.
31. Military Science
32. Chemistry Bldg.
33. Robinson Lab.
34. Garage
35. Laundry
36. Service Bldg.
37. Brown Hall
38. Lord Hall
39. Education Bldg.
40. Athletic House
41. Music Bldg.
42. Armory
43. Hayes Hall
44. Derby Hall
45. Administration Bldg.
46. University Hall
47. Library
48. Board of Health Lab.
49. Orton Hall
50. Mendenhall Laboratory
51. Commerce Bldg.
52. Page Hall
53. Archaeological Museum
54. Residence
55. Ohio Union
56. Nurses' Home
57. Residence
58. Mack Hall
59. Oxley Hall
60. Pomerene Hall
61. McMillen Observatory
62. President's Res.
63. Browning Theatre
64. Pharm. & Bact.
65. Physical Education Bldg.
66. Home Management House
67. Teacher Training Bldg.
PORTION OF GROUNDS
THE OHIO STATE UNIVERSITY
Scale of Feet
100 0 100 200 300 400 500 600 700 800 900 1000
1931.